PB87-190013

Superfund Record of Decision: (EPA Region 3) Limestone Road Site Cumberland, Maryland, September 1986

(U.S.) Environmental Protection Agency
Washington, DC

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Office of
Emergency and
Remedial Response

EPA/ROD/R03-86/026
Sept 1986

EPA

Superfund Record of Decision:

Limestone Road, MD

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16. ABSTRACT

The Limestone Road site is located 2.5 miles east southeast of Cumberland, Allegheny County, MD on the western flank of Irons Mountain. The 210-acre site consists of two parcels of land, the former Diggs Sanitation Company (DSC-20 acres) and the Cumberland Cement and Supply Company (CC & SC - 191 acres). The site is bordered on the southwest by several residences, and immediately to the northwest lie the Cumberland City Dump and undeveloped land. The site includes large areas of landfilled and dumped commercial, residential and demolition refuse on both properties. About 110 tons of a chromium containing sludge were also disposed of on the properties. Currently, 18 residences are within a half-mile downhill of the site, 5 within 100 yards, and one on the Diggs property. The water supply for these residences is ground water from private wells. Ground water in the area of the site has the potential to be contaminated with inorganic and organic constituents. In the mid 1970s, Mr. Charles Steiner, President of CC & SC, began allowing various contractors to dump clean fill (housing demolition material) on the property to provide a larger and more level working surface. However, a variety of waste has reportedly been dumped into a ravine on the property. In April 1981, Mr. Joseph Diggs, a licensed hazardous waste hauler and owner of DSC, was allegedly involved in the dumping of 99 tons of hazardous waste containing chromium, lead, and cadmium into a ravine on CC & SC property. In addition, an alleged 11 tons of hazardous waste have
(See Attached Sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Limestone Road, MD Contaminated Media: gw, sw, sediments Key contaminants: VOCs, organics, inorganics, TCE, chromium		

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report) None	21. NO. OF PAGES 77
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16. ABSTRACT (continued)

been reportedly disposed of on the Diggs property as an extension of previous filling and grading operations. The nearby Cumberland City Dump functioned as a municipal landfill from 1932 to 1968. Fly ash, miscellaneous solid metal wastes, and numerous tires are currently exposed on the northern and southern faces of the dump. Several crushed and rusted drums were noted along the banks of the inactive landfill. The primary contaminants of concern include: VOCs, base-neutral compounds, TCE, PCE,& heavy metals.

The selected interim remedial action includes: site grading; capping of contaminated soil on all properties; fencing of both properties; continued monitoring of groundwater, surface water, and sediment; complete historical review of pertinent geological information; collection of regional offsite and onsite geological information; chemical analysis of the shale to determine its composition; reevaluation and establishment of background data control points; frequent sampling to increase the data base; increase in the number of stream and residential sampling; evaluation of the effects of natural and/or domestic (plumbing) conditions on the overall water quality of the area. The estimated capital cost is $1,192,580. O&M cost will be determined after completion of ground water studies.

RECORD OF DECISION

REMEDIAL ALTERNATIVE SELECTION

Copy of ROD
FYI

Site: Limestone Road Site, Cumberland Maryland

Documents Reviewed

I am basing my decision principally on the following documents describing the analysis of cost effectiveness and feasibility of remedial alternatives for the Limestone Road Site. Also, meetings to discuss these remedial alternatives have been conducted with the state and the general public. I have been briefed by my staff on the documents and the meetings and they form the principal basis for my decision.

- Limestone Road Remedial Investigation (CH_2M Hill, August, 1986)
- Limestone Road Feasibility Study (CH_2M Hill, June, 1986)
- Staff summaries and recommendations
- Summary of Remedial Alternatives Selection
- Responsiveness Summary

Description of Selected Interim Remedy

- Site grading
- Capping of contaminated soil on all properties
- Fencing of both properties
- Continued monitoring of ground water, surface water and sediment
- Complete historical review of pertinent geological information
- Collection of regional, offsite and onsite geological information
- Chemical analysis of the shale to determine its composition
- Reevaluate and establish background data control points
- Frequent sampling to increase the data base
- Increase the number of stream and residential sampling
- Evaluate the effects of natural and/or domestic (plumbing) conditions on the overall water quality of the area
- A decision will be made later regarding surface water sediment and ground water runon interception. The above studies, including any additional further studies will be done to characterize the site in terms of the geology and hydrology by EPA and the Maryland Waste Management Administration, and evaluated for future remedial action.

Declarations

Consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and the National Contingency Plan (40 CFR Part 300). I have determined that the described selected alternative provides adequate protection of public health, welfare, and the environment. The State of Maryland has been consulted and agrees with the approved remedy.

I have also determined that the action being taken is appropriate when balanced against the availability of Trust Fund monies for use at other sites.

9/30/86
Date

James M. Seif
Regional Administrator

Site Description and Summary of Remedial Alternative Selection for the Limestone Road Site

Site Location and Description

The Limestone Road site is located on the western flank of Irons Mountain near Cumberland, Maryland. The site lies entirely within Allegheny County, Maryland, 2.5 miles east southeast of the city of Cumberland (Figure 1 and 2). The 210 acre site consists of two parcels of land, the former Diggs Sanitation Company (20 acres) and the Cumberland Cement and Supply Company (CC&SC - 191 acres). The site is bordered on the southwest by several residences; immediately to the northeast lie the Cumberland City Dump and undeveloped land.

The site includes large areas of landfilled and dumped commercial, residential and demolition refuse on both properties. In addition, about 110 tons of a chromium containing sludge were disposed of on the properties. Through surveillance and sampling operations by the Maryland State Department of Health and Mental Hygiene (MDHMH) and the U.S. EPA Region III Field Investigation Team (FIT), suspected areas of dumping totalling approximately 30 acres were defined on the site. In 1983, the two properties were assigned a Mitre Model hazard ranking of 30.54, which qualified them for inclusion on the National Priorities List (NPL) as a Superfund site. The Cumberland City Dump, though not included in the site definition used for inclusion of the Limestone Road site on the NPL, was included in some of the field investigative work.

Currently, 18 residences are within a half mile downhill of the Limestone Road Site, 5 within 100 yards of the site, and 1 on the Diggs property. The water supply for residences of these nearby homes is ground water from private wells. Ground water in the area of the site has the potential to be contaminated with inorganic and organic constituents from the site. Ground water occurs under both artesian and unconfined conditions in the area. The shales behave as a single hydrostratigraphic unit and provide all of the private water supply in the area. Because of extensive fracturing, some wells in the shale of the Limestone Road site yield up to 20 gallons per minute. The average is probably somewhere in the range of 5 to 7 gpm.

Surface water drainage in the vicinity of the site is to unnamed tributary streams that flow either directly to the North Branch or to Evitts Creek, which is tributary to the North Branch. A spring discharging from the base of CC&SC property feeds a tributary that flows south-southwesterly to the North Branch. Another spring that discharges from the base of the Cumberland City Dump feeds a stream that flows into an unnamed tributary that eventually discharges into Evitts Creek just before its confluence with the North Branch. This same tributary receives runoff from a steep eroded slope of exposed fly ash about 1, 800 feet upstream of its confluence with the stream and spring emanating from the base of the city dump.

Site History

On September 26, 1956, Cumberland Cement and Supply Company (CC&SC) purchased an undivided one-half interest in a 191 acre parcel of land located on Limestone Road. On September 19, 1973, CC&SC purchased the remaining half interest of the parcel. Mr. Charles Steiner, President of CC&SC, indicated that the property was purchased with the intent of using a preexisting limestone quarry on the property. Limestone had been quarried in areas to the north and east of the site, however the quarry was never worked by CC&SC.

In the mid - 1970's, Mr. Steiner began allowing various contractors to dump clean fill (housing demolition material) on the property to provide a larger and more level working surface. However, bricks, mortar, stone, concrete, wood, domestic garbage, drums, mattresses, glass, furniture, tires, clothing, glass industry waste, wooden spools, and pallets have all reportedly been dumped into a ravine on the property.

The party primarily responsible for the dumping of chromium-contaminated hazardous wastes on the CC&SC property was Diggs Sanitation, Inc. The owner and operator of this facility was Joseph T. Diggs, a licensed hazardous waste hauler. Allegedly, 99 tons of hazardous waste containing chromium, lead, and cadmium from Fairchild Republic, Hagerstown, Maryland, were dumped into a ravine on the CC&SC property in April 1981 by Diggs Santation.

Diggs Sanitation operated from the Diggs property on Limestone Road and was also involved with commercial storage and salvage. Filling and grading operations took place on the property prior to the mid-1960's. Debris and refuse have been disposed of there since. In addition, an alleged 11 tons of hazardous waste from Fairchild Republic, Hagerstown, Maryland, have been reportedly disposed of on the Diggs property.

The nearby Cumberland City Dump functioned as a municipal landfill from 1932 to 1968. Fly ash from coal burning, miscellaneous solid metal wastes, and numerous tires are currently exposed on the northern and southeren faces of the dump. Several crushed and rusted drums were noted along the banks of the inactive landfill. The amounts of household type wastes that may have been disposed of in the landfill are unknown.

A complaint and order were issued to Diggs and the CC&SC in June 1981 by the MDHMH, Office of Environmental Programs, requiring them to clean up their respective properties. In March 1982, the Region III FIT conducted a preliminary assessment of the conditions at the site. Waste samples collected from the CC&SC drum area contained ethyl benzene, fluorantheine, various phthalates, benzo (a) anthracene, phenanthrene, pyrene, benzene, 1,1,2,2 - tetrachloroethane, transdichloroethene, and naphthalene. Surface waters showed little evidence of contamination. One residential well contained 0.01 ppm of tetrachoroethene, as well as trace amounts of 1,1,1, - trichloroethane.

Current Site Status

EPA Region III completed a Remedial Investigation/Feasibility Study (RI/FS) at Limestone Road in July 1986. Data collected in the RI and in previous studies done by EPA's Field Investigation Team (FIT) and the Maryland Department of Health and Mental Hygiene (MDHMH) were used to describe the nature and extent of contamination. Additional soil, sediment, surface water, and ground water samples will be collected during design.

Pathways and receptors are described in detail along with known or suspected risks posed by contaminants in the RI/FS Reports and in the EPA Region III Technical Support Documents.

The following is a brief summary of the types and concentrations of contaminants detected during the remedial investigation:

- Inorganic contaminant concentrations found in the soils of the Diggs property were highest in the area of test pit ST018. The inorganics of principal interest on the Diggs property when ranked from highest to lowest concentration are as follows: zinc (4,090 mg/kg), lead, manganese, copper, barium, nickel, chromium, selenium, arsenic, cadmium, and cyanide (6 mg/kg).

- On the CC&SC property, the inorganic contaminants were concentrated in test pit areas ST010 and ST030. The inorganics of principal interest on the CC&SC property when ranked from highest to lowest concentration are as follows: chromium (97,600 mg/kg), manganese, barium, cadmium, zinc, lead, copper, cyanide, arsenic, selenium, and nickel (51 mg/kg). Based on test pit and soil boring depth chemical analysis results, it is estimated that chromium in this area can be found in a 5-foot layer, approximately 1.5 feet beneath the surface.

- Organics in the soil on the Diggs property were more widely distributed numerous, and greater in concentration than on the CC&SC property. On the CC&SC property they were concentrated largely in the area of test pits ST010 and ST030. The principal organics detected onsite were base/neutral compounds such as benzo(a)pyrene, pesticides such as chlordane, and volatiles such as trichloroethene, tetrachloroethene, and 1,1,2-trichloroethane. Concentrations of the organic contaminants ranged widely from 57,000 ug/kg for the base/neutral fluoranthene to 2 ug/kg for the pesticide Endosulfan II.

- Results of the analytical testing program indicate that ground water degradation has occurred as a result of landfilling operations in the area. Degradation occurs primarily in the form of inorganic constituents, some of which are considered to be toxic.

- The distribution of toxic inorganic constituents in ground water is sporadic, showing no definable trend, with perhaps the exception of nickel. Toxic inorganic constituents detected include cadmium, chromium, cyanide, lead, mercury, and silver. The concentration of cadmium detected in monitoring well MW10 (10 ug/l Phase I) equaled the Primary Interim MCL (10 ug/l) and exceeded the Proposed Recommended MCL (5 ug/l).

- The concentrations of lead in monitoring well MW6 (66 ug/l Phase I) and residential wells DW8 (81 ug/l Phase I) and DW16 (134 ug/l Phase III) exceeded both the Primary Interim and Proposed Recommended MCL's of 50 ug/l and 20 ug/l, respectively. Readings obtained from these wells did not always exceed values specified in the MCL lists.

- The distribution of these constituents in residential wells is more difficult to interpret, as many are naturally occurring constituents of groundwater. The concentrations of iron and manganese in all residential wells except DW9 and DW10 exceed the secondary MCL established for the protection of human welfare. Concentrations of zinc in residential wells DW7, DW9, and DW16 exceeded the Proposed Recommended MCL of 5,000 ug/l.

- The distribution of organic constituents is more sporadic and less consistent than the distribution of inorganic constituents in groundwater. No observable trend can be identified correlating the occurrence of these compounds with landfilled areas. Nevertheless, the possibility does exist given the uncertain nature of flow in fractured media.

- Inorganics of primary interst in the surface waters emanating from both the CC&SC and Diggs property were chromium, cadmium, and zinc. Inorganics in the surface water influenced solely by the city dump were not substantially different from those detected in the other surface waters.

- Only the organic bis(2-ethylhexyl) phthalate was detected in low levels (5 ug/l) in the surface water at locations SW005, SW006 and SW007.

- Inorganic contaminants of importance detected in the stream sediment influenced by the CC&SC property when ranked according to concentration are as follows: manganese (2,030 mg/kg), barium, chromium, lead, nickel, and cadmium (4.5 mg/kg). On the Diggs property (primarily at location SD005), the inorganics when ranked are as follows: manganese (144,000 mg/kg), zinc, nickel, barium, lead, copper, chromium, cadmium, and cyanide (3 mg/kg). Organics detected in the sediment were toluene, trichloroethene, benzoic acid, phenol, and benzene. Benzene and trichloroethene were detected only

once at sites SD005 and SD006, respectively. Toluene was detected at sites SD001, SD002, SD003, SD004, SD005, and SD006 at concentrations from 5 to 6 ug/kg.

Based on the quantitative findings presented in the risk characterization, it is evident that a threat of direct contact to the public health and environment exists from the chemicals at the Limestone Road site. The chemicals exist in amounts above background that, if ingested from the soil, sediment, or waters could cause harm to human ingestors and perhaps to other animals. The following lists important findings of the quantifiable portion of the public health evaluation and environmental assessment.

- The noncarcinogens manganese, cadmium, lead, and zinc were present in the groundwater and will exceed acceptable daily intake levels if ingested at the published rates, in addition to exceeding standards and guidelines established for safe drinking water. Nickel appeared in concentrations that will also exceed its acceptable intake level. It may be that the presence of the above in groundwater is a result of site soil contamination or some constituents (such as lead and zinc) may have originated from contact of the water with old or corroding piping or natural occurrence. Further evaluation of the ground water will hopefully delineate the problem.

- Soil at the site contained the carcinogens benzo(a)pyrene, benzo(a)-anthracene, benzo(b) fluoranthene, indeno (1,2,3-cd)pyrene, chrysene, beta-HCCH, chlordane, heptachlor, PCB's, 1,1,2-trichloroethane, trichloroethene, and tetrachloroethane in concentrations that resulted in site total excess lifetime cancer risks of $6x10^{-2}$, $1x10^{-3}$, $2x10^{-4}$, and $5x10^{-4}$ for the upper and lower residential, recreational, and occupational exposures. The polycyclic aromatic hydrocarbons were the significant contributors to these risks. Total risk based on mean contaminant concentrations were $2x10^{-3}$, $2x10^{-5}$, and $1x10^{-4}$ for the upper and lower residential, recreational and occupational exposures.

- Noncarcinogens in the soil including arsenic, barium, cadmium, chromium (both +3 and +6), copper, lead, cyanide, manganese, nickel,

selenium, and zinc when ingested at published rates of ingestion will exceed their acceptable daily intake levels for adults and/or children. Note that, in the soil chromium may be expected to be found predominantly in the trivalent form because of the presence of reducing organics. This would mean that exceedances of the acceptable intakes for the +6 form of chromium may not be relevant.

- Sediment at the site contained the quantifiable carcinogens benzo (a) anthracene, benzo (b) fluoranthene, indeno (1,2,3-cd) pyrene, chrysene, benzene, and trichloroethene. Total risks associated with these chemicals were $5x10^{-4}$, $3x10^{-5}$, $3x10^{-6}$, and $1x10^{-5}$ for the upper and lower residential, recreational, and occupational exposures.

- The noncarcinogens arsenic, barium, cadmium, chromium, (assumed as +6), copper, lead, manganese, nickel, and zinc were present in the sediment in concentrations which, if ingested (at published rates of soil/sediment ingestion), will exceed acceptable intake levels for children. Note that in the sediment, chromium may be found predominantly in the trivalent form, and therefore, any exceedance of the +6 acceptable intake for chromium may not be applicable.

- Surface waters contained no quantifiable carcinogens and their ingestion does not present an excess lifetime cancer risk.

- Noncarcinogens present in the site's surface water that exceeded acceptable daily intakes were barium, cadmium, chromium, lead, manganese, nickel, selenium, and zinc. Cadmium, total chromium (if assumed to exist as +6), copper, selenium, and zinc violated the Ambient Water Quality Criteria established for the protection of aquatic life. Note that for the chromium, its predominant form in surface water is probably +6, although a small amount may be found as +3. This means that, in this instance, the assumption of chromium existing as +6 is relevant and the exceedance applicable.

- The quantifiable risk from inhalation exposure to carcinogenic chemicals at the site was $2x10^{-6}$ accounting for both the wind erosion plus mechanical resuspension of dust. For wind erosion alone, the carcinogenic risk was $3x10^{-7}$.

- Only the quantifiable carcinogens have been presented; other carcinogenic chemicals were discovered at the site, but only rarely, and did not contribute substantially to risks.

The summary of site endangerment issues is shown in Table 1.

Table 1

[illegible]

[illegible] The endangerment factors described below are considered to be limiting with respect to those contaminants for which [illegible] this is a reasonable assessment and does not consider the exposure of the population to [illegible] the assessment often takes into account background concentrations to determine endangerment based solely on concentrations [illegible] present [illegible] which have been [illegible]

(RISKS ARE LISTED IN ORDER OF INCREASING, FIRST [illegible] OF RISKS INVOLVED)

Appropriate and Relevant Exceedances[a]	Surface Water			Sediment			Soil			Groundwater		
	Element	No. Times/ Location (mg/l)	Total No. Exceedances/ Total No. Samples[b]	Element	No. Times/ Location (mg/kg)	Total No. Exceedances/ Total No. Samples[b]	Element	No. Times/ Location (mg/kg)	Total No. Exceedances/ Total No. Samples[b]	Element	No. Times/ Location (mg/l)	Total No. Exceedances/ Total No. Samples[b]
1x10⁻⁶ Cancer Risk Exceedance	NO ENDANGERMENT Ingestion of surface water highly unlikely, no carcinogens present in surface water.			MINOR ENDANGERMENT Arsenic only carcinogen in sediment risk - see summary comment.			(Risk from arsenic discounted - see summary comment) Benzo(a) pyrene 26.5/SB013 10/67 B [illegible] 0.955/SB010 1/67 DDT 0.775/SB001 1/67 Dieldrin 0.975/SB001 1/67 Chlordane 1.77/SB001 1/67 Heptachlor 0.971/SB010 1/67 PCB 0.90/SB010 1/67	NO ENDANGERMENT No carcinogens detected above but present in groundwater.		
Acceptable Chronic Intake Exceedance	MINOR ENDANGERMENT Ingestion of surface water highly unlikely.			Cadmium 81/SB005 4/24 Lead 151/SB005 9/24 Manganese 177133/SB005 3/24 Nickel 737/SB005 7/24 Zinc 11919/SB005 7/24 Note that the maximum concentration of these elements occur at SB005, a location that is influenced by the city dump. All zinc, manganese, and nickel exceedances occurred at location SB005.			Beryllium 733/SB005 3/67 Cadmium 605/SB030 10/67 Chromium+3 97587/SB030 1/67 Chromium+6 97587/SB030 10/67 Copper 1760/SB004 1/67 Lead 1013/SB010 11/67 Manganese 4640/SB010 1/67 Nickel 581/SB004 1/67 Selenium 65/SB007 5/67 Zinc 4040/SB004 1/67	Cadmium 10/RW010 3/91 Lead 134/RW016 3/91 Manganese 6334/RW010 6/91 Nickel 318/RW017 7/91 Zinc 18930/RW007 10/91	
Primary Interim Maximum Contaminant Limit Exceedance (Safe Drinking Water Act - Health Based Standard)	MINOR ENDANGERMENT Ingestion of surface water highly unlikely.			NOT APPLICABLE			NOT APPLICABLE			MINOR ENDANGERMENT Lead 134/RW016 3/91 (Risk noted because only detected in one stage of sampling.) RW016		
Secondary Maximum Contaminant Limit Exceedance (Safe Drinking Water Act - Welfare Based Standard)	MINOR ENDANGERMENT Ingestion and use of surface water highly unlikely.			NOT APPLICABLE			NOT APPLICABLE			MINOR ENDANGERMENT Iron (Background concentrations greater than standard) Manganese Zinc 18,930/RW007 8/91		
Summary Comments for Endangerment from Operable Unit	Minor endangerment of human health or welfare based on assumption that ingestion of surface water from small streams at Limestone Road site highly unlikely. Endangerment to aquatic organisms in North Branch of Potomac River considered in feasibility study.			Arsenic discounted as threat based on issues addressed in endangerment assessment (see Chapters 6 RI). Endangerment exists from ingestion of sediments containing Cd, Pb, Mn, Ni, and Zn.			Arsenic discounted as threat based on issues addressed in endangerment assessment (see Chapters 6 RI). Endangerment arises primarily from ingestion of soils containing benzo(a) pyrene, PCB, cadmium, chromium, and lead.			Endangerment from groundwater ingestion arises from cadmium, lead, zinc, manganese, and nickel. Iron is discounted because background concentrations were greater than standards.		

[a] See Table 2-4 for definitions of applicable and relevant exceedances.
[b] Duplicate samples average to represent one value. Total number of samples include all locations and phases of sampling.

[illegible]

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Alternatives Evaluation

All remedial objectives are to minimize and mitigate threats to and provide adequate protection of human health, welfare, and the environment in relation to conditions caused by the CC&SC and Diggs properties. The remedial objectives for the Limestone Road site apply only to the CC&SC and Diggs properties, which constitute the site by definition in the NPL.

Remedial Objectives for Soil

Remedial objectives for soil apply to the CC&SC and Diggs properties. They focus on control of direct contact by receptors and contaminant migration (interaction with other media) by soil erosion and leaching. The remedial objectives are:

- Minimize Direct Contact—Mitigate and minimize threat to public health from direct contact with surface or buried soil at the CC&SC and Diggs properties. Specific information used to assess hypothetical situations of threat to public health was based on U.S. EPA guidance for health risk assessments. The assessment of soil volumes possibly warranting remedial action was based on public health threats arising from soil ingestion. Threats associated with dust generation or volatilization of contaminants in the soil were not estimated but were also considered.

- Control Migration to Ground Water—Minimize and mitigate leaching of contaminants from the soil into the ground water to adequately protect health of receptors using local fractured shale aquifer. This objective is general in scope. The rate of contaminant leaching was not estimated because both properties are largely refuse fill areas where migration rates cannot be estimated.

- Control Migration to Surface Water—Manage overland migration of contaminants from erosion of soil from the site properties to the local adjacent unnamed tributaries discharging to Evitts Creek and the North Branch of the Potomac River.

REMEDIAL OBJECTIVES FOR GROUND WATER

Remedial objectives for ground water will be addressed through actions directed at the site properties and actions directed at the receptors of ground water. They are:

- Minimize Direct Contaminant Consumption— Mitigate and minimize current and possible future threat to public health from direct consumption of contaminated ground water. The specific information to be used to assess the current public health threat will be Interim Primary Drinking Water Standards and U.S. EPA guidelines for health risk assessments, which consist of both carcinogenic and toxic effects considerations.

- Control Contaminant Migration to Surface Water—Manage migration of contaminated ground water to the local tributaries of Evitts Creek and the North Branch of the Potomac River so public health

and the environment are adequately protected from surface water and sediment contamination and ingestion of contaminated aquatic life.

- Control Migration of Contaminants--Minimize migration of ground water contaminants beyond the boundaries of the site properties to adequately protect human health, welfare, and the environment.

U.S. EPA has provided policy guidance on meeting the NCP objectives for ground water. General ground water cleanup objectives for each of three aquifer classifications are described in U.S. EPA's Ground Water Protection Strategy (1984).

The fractured shales aquifer that serves as the local aquifer for residents along Limestone Road is considered a Class II aquifer. The U.S. EPA's general cleanup policy objectives under CERCLA and RCRA for Class II aquifers that are presently being used for drinking water supply are to develop remedial actions that protect human health and the environment.

REMEDIAL OBJECTIVES FOR SURFACE WATER

Objectives for surface water will be addressed in relation to the effects caused by the CC&SC and Diggs properties. Surface water objectives will be in terms of protection of aquatic organisms from toxic contaminants. Objectives for protection of human health and welfare are secondary considerations because ingestion of surface water is very unlikely and is considered a minor component of overall endangerment. The remedial objectives are:

- Control Aquatic Toxicity--Mitigate and minimize threats to aquatic organisms in the North Branch of the Potomac River from contaminants in surface water from the site properties. Aquatic toxicity is regarded as an environmental concern in the Potomac River and not in the small unnamed tributaries that carry surface water away from the site properties.

- Control Direct Contact--Mitigate and minimize threats to public health from direct contact with surface waters that have been contaminated by the site.

REMEDIAL OBJECTIVES FOR SEDIMENT

Objectives for sediment will be addressed in terms of effects caused by CC&SC and Diggs properties. They are:

- Direct Contact--Mitigate and minimize threats to public health and the environment arising from direct contact with sediment contaminated by the site in the local unnamed tributaries to the North Branch of the Potomac River and Evitts Creek.

Factors Used in Screening Remedial Technologies

- Technical Criteria
  - applicability to site conditions (geology, topography, etc.)
  - applicability to waste characteristics
  - effectiveness and reliability
  - implementability

- Environmental and Public Health Criteria
  - presented in Table 1

- Cost Criteria
  - increased cost offering no greater reliability or effectiveness
  - increased cost offering no greater protection of public health or environment as established by criteria

- Institutional Criteria (Compliance with other environmental laws)
  - TSCA
  - RCRA
  - CWA
  - NPDES
  - etc.

For a detailed analysis of technologies screened out see Chapters 3 and 4 of the Feasibility Study.

Technologies Considered in Detail Include:

- soil response actions
  - no action
  - access restriction
  - containment
  - removal and disposal

- ground water response actions
  - no action
  - access restriction
  - residential water supply
  - monitoring
  - containment
  - collection without treatment and discharge

- surface water and sediment response actions
  - no action
  - access restrictions
  - monitoring
  - sediment removal and disposal
  - runon and runoff control
  - surface water collection, treatment and disposal

Alternatives Considered in Detail

Five alternatives incorporating the technologies considered in detail were evaluated for remedial action in the FS. These five alternatives were:

1. Soil excavation from CC & SC and Diggs property with disposal at an offsite RCRA facility. Ground water monitoring. Surface water and sediment monitoring.

2. Capping of contaminated soil on CC & SC and Diggs property with deed restrictions and fencing. In-house water treatment by ion exchange. Surface and shallow ground water run-on interception at CC & SC property. Surface water and sediment monitoring.

3. Deed restrictions and fencing on CC & SC and Diggs properties for soil. Alternative water supply by extension and connection of Cumberland municipal water system. Surface water and shallow ground water runon interception at CC & SC property. Surface water and sediment monitoring.

4. Deed restrictions and fencing on CC & SC and Diggs properties for soil. Ground water, surface water and sediment monitoring.

5. No action. No future actions on any environmental medium. No future monitoring or access restrictions.

Alternative 1: Soil excavation from both the CC & SC and Diggs properties to remove soil having a calculated excess lifetime risk of 10 -6 or greater and exceedance of the acceptable daily chronic toxic intake for children. Excavated soil would be transported and disposed of offsite at a RCRA landfill. Ground water would be monitored regularly at both monitoring and residential wells. Surface water and sediment would be monitored regularly near both properties. Sediment in tributaries from both properties would be monitored less frequently than surface water.

The advantages of this alternative include:

- Excavation and disposal would be in accord with substantive RCRA requirements. Permits for all activities would be routine. No unusual land use changes or zoning issues involved.

- Excavation and offsite disposal effectively removes selected contaminants from the site to a controlled facility.

- Soil removal expected to improve quality of surface water.

- o Direct soil contact potential reduced and some reduction in ground water metals concentrations possible.

Disadvantages associated with this alternative include:

- o Implementation and construction safety concerns related to excavation in refuse.
- o Local environmental disruption for cleaning, grubbing, and excavation; mitigated by surface restoration.
- o Substantial noise, dust, and traffic expected.
- o Possibility of some contamination in private wells due to the inability of removing all contaminants. Would have to rely on monitoring to adequately protect public health.

Costs

Capital and operation and maintenance costs were obtained from the FS. Capital costs include:

- Soil Excavation from CC & SC and Diggs Properties = $13,279,300
- Surface Water and Sediment Monitoring (Yearly) = $67,800

Total Capital Costs = $14,332,300

Operation and maintenance Costs = $1,053,000 based on a 30 year period.

Alternative 2: Limited soil capping at both properties: the western portion of the fill area on the CC & SC property and a large fraction of the refuse fill area on the Diggs property would be capped with a relatively imperious multilayer system. The capping system used as the basis for the cost estimate was clay and soil. Ground water used for consumption in private homes on Limestone Road would be treated for metals removal by ion exchange in small in-home treatment systems. Ground water and potable water would be monitored regularly to check treatment system performance. At the CC & SC property, surface water and shallow ground water run-on would be intercepted upgradient to the refuse fill area in a gravity trench and diverted to the CC & SC tributary south of the area of contaminated soil. Surface water and sediment in tributaries from both sites would be monitored regularly, though sediment less frequently.

The advantages of this alternative include:

- o Implementation does not involve unusual hazards as in Alternative 1.
- o Capping would isolate contaminated soil and reduce infiltration; run-on diversion at CC & SC would further reduce migration.

- o Water Treatment would reduce risks related to metals ingestion. Long-term public health protection benefit based on water treatment for residential wells.

- o Standards for drinking water would be consistently met in all homes. Permits for all activities would be routine.

Disadvantages associated with this alternative include:

- o Local environmental disruption for cleaning and grading; mitigated by cap revegetation, but not as substantial as in Alternative 1.

- o Construction related noise, dust and traffic from import of capping materials.

- o In-house water treatment by ion exchange is somewhat unreliable, dependent upon proper long-term operation and maintenance.

Costs

- Capping of Properties = $494,600
- Fencing both Properties = $48,700
- Residential Well Water Treatment = $22,300
- Surface Water and Shallow Ground water Diversion System Upgradient Run-on Interceptor Trench at CC & SC Property = $427,000
- Surface Water and Sediment Monitoring (Yearly) = $37,800
- Ground Water Monitoring (Yearly) = $72,900

Total Capital Costs = $1,775,800

Operation and Maintenance Costs = $1,058,00
based on a 30 year period

Alternative 3: Deed restrictions on both site properties to restrict future land use and fencing to restrict casual site access. Ground water used for consumption in private homes on Limestone Road would be furnished by extension of the Cumberland water system and connection of all homes. At the CC & SC property, surface water and shallow ground water run-on would be intercepted in a gravity trench and diverted to the CC & SC tributary south of the area of contaminated soil. Surface water and sediment in tributaries from both sites would be monitored regularly, though the sediment less frequently.

The advantages of this alternative include:

- o Positive performance because of alternate water supply. Municipal system considered very reliable, much more so than in-house water treatment as in Alternative 2.

- o Overall safety regarded as high because all actions are conventional construction with minor contact with contaminated materials.
- o Minor environmental effects.
- o Standards for drinking water would be consistently met in all houses.

Disadvantages associated with this alternative include:

- o Applicable laws and regulations will not be met.
- o Some cleaning and grubbing would be necessary to install the fencing, trench, and municipal water supply lines.
- o Would not reduce infiltration and subsequent contaminant transport from the site properties.
- o Surface water runoff and ground water discharge quality from the Diggs property would remain unchanged.

Costs

- Fencing both Properties = $48,700
- Connection to Cumberland City = $91,000
  Water Supply
- Surface and Shallow Ground Water Diversion System, Upgradient Run-on Interceptor Trench at CC & SC Property = $427,100
- Ground water Monitoring (Yearly) = $72,900
- Surface Water and Sediment Monitoring (Yearly) = $37,800

Total Capital Cost = $990,600

Operation and Mainentance Costs = $1,066,200
(based on a 30 year period)

Alternative 4: Limited passive actions on all site media. Incorporates deed restrictions on both the CC & SC and Diggs properties to reduce likelihood of direct soil contact caused by future development. Fencing properties would restrict casual site access. Ground water would be monitored regularly at both monitoring and residential wells. Monitoring would also be applied to the surface water and sediment on a regualr basis.

The advantages of this alternative include:

- o No construction - related effects, except for site fencing.

- o Continued monitoring would track the behavior of the site into the future to provide data sufficient to trigger a remedial action.

Disadvantages associated with this alternative include:

- o Applicable laws and regulations will not be met.
- o Existing and potential future endangerment to public health, welfare, and the environment would not be mitigated.
- o No ground water protection for private homes.

Costs

- Fencing both Properties = $48,700
- Ground water Monitoring (Yearly) = $72,900
- Surface Water and Sediment Monitoring (Yearly) = $37,800

Total Capital Costs = $100,900
(includes engineering design costs)

Operation and Maintenance Costs = $1,048,300
(based on 30 years)

Alternative 5: No action. No future actions on any environmental medium. No future monitoring or access restrictions. This alternative is not appropriate because:

- o Uncontrolled migration of contaminants.
- o Uncontrolled ingestion of contaminated ground water.
- o Migration of all contaminants would not be monitored.
- o No compliance with laws and regulations.
- o Existing and potential future endangerment to public health, welfare, and the environment would not be mitigated.

No costs are associated with this alternative. Table 2 summarizes these alternatives.

Recommended Alternative

An interim alternative has been chosen to remediate the Limestone Road site. This interim alternative will consist of capping of the properties, fencing both properties, and continued surface water, sediment

	ASSEMBLED ALTERNATIVE NO. 1	ASSEMBLED ALTERNATIVE NO. 2	ASSEMBLED ALTERNATIVE NO. 3	ASSEMBLED ALTERNATIVE NO. 4	ASSEMBLED ALTERNATIVE NO. 5
	Soil excavation from CCASC and Diggs property with disposal at offsite RCRA facility. Groundwater monitoring. Surface water and sediment monitoring	Capping of contaminated soil on CCASC and Diggs Property with deed restrictions and fencing. In house water treatment by ion exchange. Surface and shallow groundwater zones interception at CCASC property. Surface water and sediment monitoring.	Deed restrictions and fencing on CCASC and Diggs properties for soil. Alternate water supply by extension and connection of Cumberland municipal water system. Surface water and shallow groundwater zones interception at CCASC property. Surface water and sediment monitoring.	Deed restrictions and fencing on CCASC and Diggs properties for soil. Groundwater monitoring. Surface water and sediment monitoring	No action. No future actions on any environmental medium. No future monitoring or access restrictions.
ORDER-OF-MAGNITUDE COST ESTIMATES[a]					
Total Capital[b]	$11,300,000	$1,700,000	$ 991,000	$ 101,000	$ 0
Annual O&M	$ 112,000	$ 112,000	$ 113,000	$ 111,000	$ 0
Present Worth[c]	$14,300,000	$2,850,000	$2,060,000	$1,150,000	$ 0
TECHNICAL CRITERIA[d]					Not Applicable.
Performance	+ Excavation and offsite disposal effectively removes selected contaminants from site to controlled facility. Monitoring would trigger contingency actions if future conditions change to warrant further actions.	+ Performance positive because of capping and, especially, water treatment. Capping would isolate contaminated soil and reduce infiltrating rainon diversion at CCASC would further reduce migration. Water treatment would reduce risks related to metals ingestion.	+ Positive performance because of alternate water supply. Municipal system considered very reliable. Overall safety regarded as high because all actions are conventional construction with minor contact with contaminated materials.	+ Performance based on the effectiveness of monitoring to identify future changes warranting action. + Monitoring considered reliable and easily implemented.	N/A
Reliability	- Implementation and construction safety concerns related to excavation in refuse.			N/A	N/A
Implementability					N/A
Safety					N/A
ENVIRONMENTAL CRITERIA[d]					
Biological	+ Soil removal expected to improve quality of surface water somewhat in long term. Local environmental disruption for clearing, grubbing, and excavating, mitigated by surface restoration. Substantial noise, dust, and traffic expected. About 150 truckloads from CCASC and 150 truckloads from Diggs property.	+ Capping expected to improve quality of surface water somewhat, not substantially, in long-term. Local environmental disruption for clearing and grading; mitigated by cap revegetation. Construction related noise, dust, and traffic from import of capping materials.	+ Environmental conditions would not change by actions but future trends would be monitored. Minor environmental effects. Minor efforts on human environment.	+ Monitoring would identify cause for future actions as necessary. Both environmental and human effects would be minor.	- Migration of contaminants uncontrolled. Ingestion of possibly contaminated groundwater uncontrolled. Migration of all contaminants would not be monitored.
Human Environment					
INSTITUTIONAL CRITERIA[d]					
Standards	+ Excavation and disposal would be in accord with substantive RCRA requirements. Permits for all activities would be routine. No unusual land use changes or zoning issues involved. Site properties would remain refuse landfills following excavation and surface restoration.	+ Standards for drinking water would be consistently met in all homes. Permits for all activities would be routine. No unusual land use changes or zoning issues involved. Site properties would remain refuse landfills following capping.	+ Standards for drinking water would be consistently met in all homes. Permits for all activities would be routine. No unusual land use changes (except restrictions on future development and access) or zoning issues involved. Site properties would remain refuse landfills.	+ No unusual permit, land use, or zoning issues involved. Standards would be used as the basis for evaluating monitoring data.	+ Compliance with standards, especially drinking water standards, unknown and not monitored. No permit, land use, or zoning issues involved.
Permits					
Land Use and Zoning					
PUBLIC HEALTH CRITERIA[d]					
Short-Term	+ Direct soil contact potential reduced and some reduction in groundwater metals concentrations possible. Long-term public health protection based on routine monitoring of groundwater, surface water, and sediment	+ Direct soil contact potential reduced and some reduction in groundwater and surface water metals concentrations possible. Long-term public health protection benefit based on water treatment for residential wells.	+ Direct soil contact potential reduced and some reduction in metals migration from CCASC property to surface water and groundwater possible. Long-term public health protection benefit based on municipal water supply to local residents.	Short- and long-term public health would be protected by monitoring to observe the trends of groundwater, surface water, and sediment quality. Remedial actions could be triggered in the future by monitoring data.	No short-term or long-term monitoring to identify future changes in groundwater, surface water, or sediment quality.
Long-Term					

[a] The American Association of Costs Engineers define an Order-of-Magnitude as an approximate estimate made without detailed engineering data. It is normally expected that an estimate of this type is accurate within +50 percent to -30 percent. Sources of cost information include the U.S. EPA's "Compendium of Cost of Remedial Technologies at Hazardous Waste Sites," the 1986 Means Site Work Cost Data Guide, Cost Reference Guide for Construction Equipment 1986, and vendor estimates.

[b] Total Capital Cost includes indirect cost for engineering services, legal fees, administration costs, and contingency.

[c] Total Present Worth is based on 10 year period at 10 percent interest. Uniform series present worth factor 6.1459

[d] The rank system shown for each criterion factor is as follows:

- Negative effects but strong enough or certain enough to be sole justification for eliminating an alternative; or of only moderate negative significance
- 0 Little positive or negative effect; inclusion can be justified for some specific reasons or no relative change in conditions.
- + Positive or moderately positive benefit

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and ground water monitoring. Continued monitoring of the site will determine if a surface water and shallow ground water diversion system and an upgradient run-on interceptor trench at the CC & SC property is needed in the future for continued protection of aquatic life and wildlife. A complete historical review of pertinent geological information and regional, offsite and onsite geological information will be collected. Chemical analysis of the shale and reevaluation of background data control points will be conducted. Furthermore, a more detailed evaluation will be conducted concerning the residents drinking water. Upon completing this evaluation, a final remedial alternative will be selected. Based on our evaluation of the cost-effectiveness of each of the proposed alternatives, the comments received from the public, the state, and potentially responsible parties, information from the RI/FS and Region III technical support documents, Region III recommends that the above interim alternative be implemented.

Consistency With Other Environmental Laws

The recommended interim alternative was evaluated to determine consistency with applicable or relevant and appropriate environmental laws.

Due to the elevated levels of hazardous substances present in the soils and wastes on the Diggs and CC&SC properties, portions of the RCRA landfill closure requirements (40 CFR §264.310) are relevant and appropriate. A cap is necessary and will be designed and implemented to comply with the final cover requirements of §264.310(a). The cap will also be maintained and repaired as necessary to comply with §264.310(b)(1). During design, good engineering practice controls will be selected to prevent run-on and run-off from eroding or damaging the cap as per the requirements of §264.310(b)(5). Compliance with the groundwater monitoring requirements of §264.310(b)(4) and Subpart F is being deferred at this time and will be evaluated at the conclusion of the additional studies discussed above. Because there are no existing leak detection or leachate collection systems, the requirements of §264.310(b)(2) and (3) are not applicable or relevant and appropriate.

There are no surface water discharges subject to NPDES requirements; However, if additional studies find that groundwater and surface water collection is necessary, NPDES requirements may be applicable to offsite discharges.

Costs

The American Association of Cost Engineers defines an Order-of-Magnitude Estimate as an approximate estimate made without detailed engineering data. It is expected that an estimate of this type is accurate within + 50% to -30%. Sources of cost information include the EPA's "Compendium of Cost of Remedial Technologies at Hazardous Waste Sites," the 1986 Means Site Work Cost Data Guide, Cost Reference Guide for Construction Equipment

1986 and vendor estimates. The projected costs for the recommended alternative are as follows:

Cost Component	Construction Cost	O & M Cost
1. Capping of Properties		
Site preparation of CC & SC property	$6,900	
" " " Diggs	9,600	
Construction of clay cap at CC & SC	101,500	
" " " Diggs	210,500	
Topsoil and seed for CC & SC	$22,100	
" " " Diggs	$65,300	
Decontamination and safety for CC & SC	$43,900	
" " " Diggs	$79,000	
Inspection, repairs, and maintenance for both properties		$1,000
Mobilization/demobilization (5%)	26,900	
2. Fencing Both Properties		
Fence for CC & SC Property	$22,300	
" " Digs property	$26,400	
Annual inspection of fence		$500
Replacement of fence (10% every 10 years)		$4,300
4. Ground Water Monitoring (Yearly)		
Sampling		$32,700
Chemical analysis		$38,200
Evaluation of results		$ 2,000

1986 and vendor estimates. The projected costs for the recommended alternative are as follows:

Cost Component	Construction Cost	O & M Cost
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Annual inspection of fence		$500
Replacement of fence (10% every 10 years)		$4,300
4. Ground Water Monitoring (Yearly)		
Sampling		$32,700
Chemical analysis		$38,200
Evaluation of results		$ 2,000

5. Surface Water and Sediment Monitoring (Yearly)

Sampling			$14,000
Chemical analysis			21,800
Evaluation of results			2,000
Construction Subtotal		$614,400	
Bid contingencies	10%	$ 61,440	
Scope contingencies	20%	$122,880	
Construction total		$798,720	
Permitting and legal	10%	79,872	
Services during construction	10%	79,872	
Total Implementation Cost		$958,464	$116,500
Engineering Design Cost	12%	$115,015	
Total Capital Cost		$1,073,480	
Present worth gradual fence replacement (10 years)			$2,600
Present worth of O & M cost Based on 30 years)			Will be determined after completion of ground water studies.
Total Present Worth		$1,192,580	

If negotiations with potentially responsible parties fail, trust fund monies will be used to pay for 90% of these costs and the State of Maryland will finance 10% of these costs. Operation and maintenance will be the responsibility of the State of Maryland one year subsequent to completion of construction.

Schedule

Public Meeting	9/11/86
Comment Period Closes	9/15/86
Approve ROD	9/86

Responsiveness Summary

The format of the response is a listing of responses according to the sources of comments. Responses are referenced to specific comments within each source as appropriate. The sources of comments on the following:

- Public meeting in Cumberland, Maryland on September 11, 1986.
- Heron, Buchette, Ruckert & Rothwell on behalf of Fairchild Industries, Inc.
- Kramon and Graham, P.A. on behalf of Cumberland Cement and Supply Company.
- State of Maryland Office of Environmental Programs, Department of Health and Mental Hygiene.

All responses are enclosed as Attachment A.

Attachment A

RESPONSES TO COMMENTS ON
THE LIMESTONE ROAD RI/FS

Comments and questions raised during the Limestone Road Public Meeting held on September 11, 1986, are summarized below. The public comment period extended from August 22, 1986 through September 12, 1986.

REMEDIAL ALTERNATIVE PREFERENCE

1. One resident recommended that homes on Limestone Road be connected to public water.

   EPA Response: EPA's announcement of an interim remedial alternative does not preclude the possibility of a hook-up to city water for the Limestone Road residences; further evaluation of the data is needed before a final decision is made.

2. When will the decision be made on a final remedial action?

   EPA Response: We cannot estimate a timeframe because we do not know what we will find during subsequent evaluation of the site data. There may or may not be more testing or further studies, but we need to conduct further examination and evaluation of the existing data before we make a decision on any further action.

TECHNICAL QUESTIONS

1. A resident of Limestone Road asked for details on where and how ground water samples were taken.

   EPA Response: The contractor designed a monitoring well network that would provide an idea of contamination leaving the site. A total of 21 monitoring wells were drilled to different depths -- the deepest being 275 feet, and the most shallow being 25 feet -- the average depth was 125 feet. Residential wells of varying depths were also sampled.

2. Did EPA examine the chlorinated solvents at the PPB level?

   EPA Response: Yes.

3. A question was raised regarding hydrogeologic studies of the aquifer.

   EPA Response: This is not an aquifer in the traditional sense. There is fractured shale under the ground which makes the ground water behave like an aquifer. But because of the nature of the fractured shale, it is extremely difficult to characterize the flow of ground water. This is why further study is required, and why only part of the solution can be presented at this time.

4. How long will the testing last, and will residents be provided test results?

   EPA Response: We do not have an estimate on the necessity, scope, or length of time required for additional testing. The state will provide residents with any testing results.

5. Several people expressed concern that their wells had dried up since testing began during the RI/FS.

   EPA Response: Because the test wells are not used constantly, we do not believe that they are stressing the ground water system. The wells were sampled three times during the RI.

6. Was any air sampling conducted?

   EPA Response: Not during the RI; however, some air sampling was done as part of the initial HRS process.

7. One resident asked if the state could take any necessary new water samples now while the weather is dry.

   State Response: New ground water sampling will commence the week of September 15, 1986, and will be conducted as rapidly as possible.

8. How much chloroform was detected?

   EPA Response: It was detected once at a low level.

PUBLIC HEALTH/ENVIRONMENTAL CONCERNS

1. How dangerous are the chemicals found in the ground water?

   EPA/CDC Response: The only contaminant level of concern was lead; the concentrations of other contaminants are not high enough to cause concern. Dr. Abraham (CDC) recommended, based on data he had seen, that two residences need alternative sources of drinking water, which has already been accomplished. EPA will provide all residents a synopsis of test well results.

COSTS/FUNDING ISSUES

1. If EPA eventually does connect the Limestone Road residences to city water, who pays for it?

   EPA Response: If it is a Superfund action, the state will pay 10% and the Fund will pay 90% of the cost. If PRPs agree (or are ordered) to finance a remedial action, then the cost share will be negotiated.

2. There was concern about the amount of money spent to date on the project, without having a final recommended remedial action.

   EPA Response: As far as we know now, the drinking water is safe (with the two exceptions noted above).

OTHER ISSUES

1. Why was the Cumberland City Dump not included in the definition of the site? It should be.

   EPA Response: We cannot offer a final solution to the problem at Limestone Road until the status of the dump is resolved. The state is addressing the dump question; it is in the hands of the state's attorney.

2. Has any testing been conducted at the dump?

   EPA Response: We have done some limited work at the dump. We are particularly concerned about the flyash at the dump.

3. Why has the process taken so long? The problem first surfaced in 1979.

   EPA Response: EPA's involvement dates from 1984.

4. What about city and county liability in the properties?

   EPA Response: Transfer of ownership does not release a person from responsibility under CERCLA.

5. What about the level of TCE at Limestone Road vis-a-vis the Woburn, MA case?

   EPA/CDC Response: The "safe" level of TCE is 5 PPB; in the Woburn case, TCE has not yet been proven to have a casual relationship to the health anomalies found in the area. TCE has not been found at Limestone Road above EPA's recommended action levels; there is no immediate health risk.

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September 10, 1986

BY FEDERAL EXPRESS

Ms. Susan E. Belski (3HW16)
Compliance Officer
U.S. EPA Region III
841 Chestnut Building
Philadelphia, PA 19107

SEP 1 1 1986

RE: Limestone Road Site, Cumberland, Maryland

Dear Ms. Belski:

This will respond on behalf of Fairchild Industries, Inc. to the letter of Mr. Stephen R. Wassersug, dated August 11, 1986, accompanying the draft Remedial Investigation and Feasibility Study (RI/FS) and inviting comments thereon no later than September 12, 1986 (as per advice from your office).

We wish to call your attention to the fact that Fairchild has noted numerous detailed comments concerning the RI/FS but has limited the following response for the purpose of addressing the major endangerment issues as presented. In so doing, it was our purpose to restrict this commentary to those matters which directly impact on the proposed remedial action. However, during the course of further discussions of the RI/FS and the proposed remedial action, Fairchild may, as it deems necessary, address further comments in order to resolve any issue presented.

General Commentary

As a general commentary the RI/FS report for the Limestone Road site contains a number of assumptions and qualifications making it difficult to reach definitive affirmative conclusions as to site contamination and endangerment. What does emerge from the data as a whole is that the detected soil contamination on the site, both organic and inorganic, has minimal impact on surface and groundwater and, therefore, presents little or no endangerment to human exposure. Moreover, the possible influence or contribution by

the City of Cumberland dump to overall contamination in the area raises significant questions as to source and responsibility which have not been addressed.

The report contains a number of statements concerning chromium and chromium sludge[1] but in the end the data does not support a conclusion that chromium plays any significant role in environmental endangerment at the site. In this connection, we believe it important to note that the Background statement in the RI (p. 1) that 110 tons of chromium sludge was dumped on the site is not substantiated. Indeed, a further statement that 99 tons were dumped on the CC&SC property and 11 tons on the Diggs property is completely groundless. In addition, while the report makes an assumption that chromium in the soil is in the hexavalent form it is conceded this may be incorrect (RI, pp. 6-33 to 6-34) and that soil chromium is expected to be found primarily in the immobile trivalent form (RI, p. 6-37). Accordingly, it seems only fair that the report contain a statement that there is little or no endangerment from the Fairchild sludge at the site.[2]

Based on the data in the RI, it is easily understood why the FS makes no selection as to a specific remedial alternative. Perhaps the unresolved issue of the City Dump is partly responsible for this but we believe it more likely that under the circumstances where little or no real endangerment could be concluded it was perhaps more judicious for the EPA contractor to review the range of possible alternatives within all five of the guidelines of the National Contingency Plan (NCP) for ultimate selection by Region III and/or the responsible parties. We have, therefore, carefully reviewed with the aid of competent consultants all of the data presented in the RI to pinpoint the real problem areas and attendant risks and will address these for pertinent remediation which is both cost-effective and consistent with the application of the NCP.

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1. This is perhaps because of the reported event (by the State of Maryland) of illegal dumping of chromium sludge from Fairchild Industries' Hagerstown, Maryland, plant in 1981 which triggered the listing of the site on the National Priorities List.

2. It must be recalled that at the time, 1981 and 1982, there were many reports in the local news media concerning Diggs' illegal dumping of Fairchild sludge raising citizens concerns that this was the primary and perhaps only hazard at the site.

If remedial measures are to be undertaken at the site, then additional efforts to identify potentially responsible parties need to be undertaken. The FS states that the Diggs property was part of the city dump for many years. (FS, p. 5-14) Therefore, it appears that the City of Cumberland may be a responsible party in connection with the Limestone Road site. In addition, potential sources of organic contaminants have not been identified. Materials in EPA's files on other PRP's suggest that these parties may have generated solvents and waste oils disposed of on the site. Other wastes possibly sent to the site (e.g., glass manufacturing wastes) should be further analyzed to determine whether they are sources of contamination at the site.

1. Adequacy of Investigation

Questions exist as to the adequacy of the site investigation. The vast majority of the soil samples analyzed were taken from subsurface material. On the other hand, all background soil samples were collected from the top ten inches of soil. (see RI, pp. 3-6 to 3-8) In explaining the differences between soil and shale with regard to concentrations of certain ions, the RI states that the ions may have been leached from the soil into the groundwater and surface waters. (RI, p. 4-11) Therefore, the background surface soil samples may not be comparable to the on-site subsurface soil samples. It should also be noted that a chemical analysis of on-site shale seems appropriate in order to properly interpret the sampling results.

There is serious concern about the adequacy of the hydrogeologic investigation. The RI states that groundwater movement in the shales appears to be dominated by fractured flow. (RI, p. 4-4) The primary fractures are perpendicular to the observed groundwater gradients based on head measurements. (RI, pp. 4-3 to 4-4, 4-8). Although a possible secondary fracture set may allow flow along the same direction as the gradient, it is not clear that the generalized groundwater flow map (RI, Figure 4-5) represents the most probable characterization of groundwater flow. In fact, the hydrogeologic investigation indicates localized groundwater flow different from the regional flow. (See Attachment A, Assessment of Hydrogeologic Findings by Dr. Paul Grosser, H2M)

2. Endangerment Issues

The major endangerment issues at the site relate to on-site soil and groundwater. (FS, p. 2-5) In order for a risk of an adverse effect from a contaminant to exist, there must be: (1) a source of the chemical; (2) a release of the chemical from the source; (3) a receptor for the release of the contaminant; (4) transport of the contaminants from the source to a receptor; and (5) exposure of the receptor at a level sufficient to produce an adverse effect. (RI, p. 6-3)

A. Soil

The remedial objectives for soil contamination are to control migration to groundwater, to control migration to surface water, and to minimize direct contact. (FS, pp. 2-6 to 2-7) The major organic contaminants of concern in soil are benzo(a)pyrene and polychlorinated biphenyls (PCB's). (see FS, Table 1) Polycyclic aromatic hydrocarbons such as benzo(a)pyrene have low solubilities and high soil-water partition coefficients, indicating a tendency to migrate very slowly. (RI, p. 5-6) Biodegradation of benzo(a)pyrene is also possible. (RI, Table 5-2). PCB's have been found at the site at "trace" concentrations only. (FS, Table 6-2) PCB's readily adsorb to soil and have very low solubilities, and thus migrate slowly. (RI, pp. 5-7 to 5-8) In addition, the PCB Aroclor 1242 is biodegradable. In conclusion, the major organic contaminants are unlikely to migrate from the site through groundwater.

The major inorganics of concern at the site are barium, cadmium, chromium, copper, lead, manganese, nickel, selenium and zinc. (FS, Table 1) The RI reviewed the environmental behavior of the "indicator" contaminants barium, cadmium, chromium, lead, nickel and zinc, and concluded that sorption had a significant effect on the migration of each of these metals. (see RI, Table 5-2) Therefore, concern regarding migration of these constituents should be minimal.

"[I]n the soil, chromium may be expected to be found predominantly in the trivalent form because of the presence of reducing organics." (RI, p. 6-33) As stated above, trivalent chromium is immobile. The groundwater sampling results, in which chromium was not detected at concentrations considered threatening to human health (RI, p. 4-25), support this conclusion.

Future exposure to predominantly subsurface soils would most likely occur if excavation or extensive erosion were to take place. (RI, p. 6-7) The prospect of excavation can be controlled with deed restrictions. The current "extensive" vegetative cover should minimize the risks of erosion. (RI, pp. 6-10 to 6-11). Fencing would also minimize direct contact with contaminated soil and allow for further growth of vegetation.

B. Groundwater

The remedial objectives for groundwater are to control migration of contaminants to groundwater and surface water and to minimize direct contaminant consumption. As stated above, the on-site soil contaminants will tend to adsorb to soil. So long as the risks of excavation and erosion are minimized, the risks of migration of contaminants to groundwater and surface water will have been adequately addressed.

The FS identifies five inorganic contaminants of concern in groundwater: cadmium, lead, manganese, nickel and zinc. (FS, Table 1) Nickel exceeded EPA's acceptable daily intake level in one sample from each of two drinking water wells. (FS, Table 2-3; RI, Figures 4-14 to 4-17) "Of all the toxic metals, only nickel appears to exhibit a trend even though a specific plume cannot be identified." (RI, p. 4-23) The report was unable to conclusively determine which filled areas might be contributing. (RI, pp. 4-24, 6-22) The report notes that a sample indicative of the leachate being generated by the city dump had a significant concentration of nickel. (RI, p. 4-24) Nickel could also be from local geological materials native to the site in contact with the groundwater. (RI, p. 6-22) The Fairchild chromium sludge did not contain nickel.

The RI notes that the concentrations of zinc in residential wells generally exceed the concentrations observed in monitoring wells by one or two orders of magnitude. (RI, p. 4-14) Zinc concentrations exceeded acceptable daily intake levels only in residential wells. (FS, Table 2-3; RI, Figures 4-14 to 4-17) No zinc plume was identified in the analytical data. (RI, p. 4-14) Therefore, it is likely that the zinc in these wells is attributable to a source other than the landfill area. The RI identifies naturally occurring high zinc concentrations and galvanized piping or tanks as among the plausible explanations for the high zinc concentration in residential wells. (RI, pp. 4-14 to 4-15)

Lead in groundwater (as well as zinc) may have originated from contact of the water with old or corroded piping or solder, but the presence of galvanized piping or water tanks in the residential wells was not investigated. (RI, pp. 4-14 to 4-15, 6-22, 6-32) Lead was detected in only one monitoring well sample. (RI, Figures 4-14 to 4-16). None of the drinking water well samples exceeded the maximum contaminant limit for cadmium. (FS, Table 2-3; RI, Figure 4-17) The toxic inorganic constituents cadmium and lead "appear sporadically in both monitoring and residential wells but show no consistent spatial or temporal distribution." (RI, p. 4-24) There is no consistent correlation between monitoring wells, residential wells and groundwater flow paths to conclusively support the contention that these constituents are migrating from landfilled areas. (RI, p. 4-25)

The RI states that the "analytical data do not indicate a discernible trend relating high concentrations of manganese in residential wells to landfilling operations." (RI, p. 4-15) The manganese levels are most likely from naturally occurring geological materials at the site.

Elevated levels of cadmium, lead, nickel and zinc were found in soil samples taken from the Cumberland City Dump (RI, Figure 4-9), suggesting this site as a possible source of inorganics in groundwater. Furthermore, cadmium, lead, manganese, nickel and zinc in sediments were found in their highest concentrations at location SD005, which receives a large portion of its contaminant input from the City Dump. (RI, p. 6-36) The sole observations above background for manganese, nickel and zinc were at this location. (FS, Table 1)

Despite the relatively high concentrations of chromium on the Diggs and the CC&SC properties, chromium has not been detected in groundwater at concentrations considered threatening to human health. (RI, p. 4-25) These results support the conclusion that the chromium is immobile. In conclusion, the levels of inorganics in drinking water rarely exceeded the applicable standards. The mineralized groundwater in the area of the site makes it difficult to draw any conclusions regarding degradation attributable to landfill areas.

C. Surface Water and Sediment

The FS concludes that the endangerment from surface water contamination is minor since ingestion of surface water would be extremely unlikely and since aquatic toxicity was not

considered applicable to the surface water in either the CC&SC or the Diggs property drainage streams (although it is considered applicable to the North Branch of the Potomac River). (FS, Table 1, pp. 2-3 to 2-4)

The remedial objective for sediment is to minimize direct contact. (FS, pp. 2-11 to 2-12) The sources of stream sediments are precipitation from surface water and erosion of soils. If the surface water is not considered a contamination problem, then the primary risk relates to erosion. Potential erosion risks are adequately dealt with by fencing and deed restrictions.

Proposed Remedial Action

Fairchild proposes that remedial action at the Limestone Road site to be accomplished include:

* Deed restrictions and fencing of refuse areas of Diggs and CC&SC properties.
* Limited monitoring of surface water.
* Extension of city water supply to local residences.

Based on the endangerment and risk assessments in the RI report, we conclude that a limited remedial action above outlined sufficiently addresses the real environmental concerns at the Limestone Road site. As already stated in these comments, these areas of concern are the contaminants in the soil and the possible effect of same on the groundwater. Possible endangerment is limited to human exposure to both media principally through direct contact with soil and drinking water consumption.

We agree with the FS analysis that this type of response -- fencing and deed restrictions of the refuse-filled area -- would reduce the likelihood of direct soil contact and casual site access. (FS, pp. 6-10 to 6-11, 6-22 to 6-23) It is also significant that since the site has been closed to dumping operations since 1981 most of the affected area is now covered with vegetation. Restricted site access would allow the vegetation to increase thereby naturally reducing possible soil erosion. Periodic monitoring of the surface water from

leachate seeps discharging from the base of the waste masses on both the Diggs and CC&SC properties for a limited period of time (annually for five years) should be sufficient to detect any trend of contamination of these environmental media.

While we had earlier investigated the feasibility of a limited clay/soil cover over the soil contaminated areas, we believe in view of the RI/FS findings and analysis that such an alternative is inappropriate and not cost effective. The two objectives cited for this remedial alternative are reduction of water infiltration that may transport contaminants to groundwater and reduction of contact with soil. Once the affected areas are properly fenced the objective of reducing soil contact by covering is redundant. In addition, it is conceded in the (FS, p. 5-13) that the selective "cap" for the CC&SC property would address less than 5% of the total volume of water that moves over and through the refuse fill. It is also concluded that the effectiveness of similar capping of the Diggs property "cannot be estimated" (FS, p. 5-15) and that "correlation of contaminant release reduction with capping system is not possible for the soil and refuse matrix at Diggs." Finally, as stated earlier, the fact that soil contamination on both properties has minimal impact on groundwater strongly suggests that any concern regarding transport of contaminants to groundwater through infiltration is insufficient to warrant the expensive cover alternative.

Fairchild also believes that the groundwater quality in the vicinity of the site, including the City Dump, may have been influenced by natural background condition as well as possible effects of landfilling operations that have taken place since 1962 when operations at the City Dump commenced. Accordingly, Fairchild recommends that modifications be made to the drinking water supplies of local residences which would constitute a response to the natural progression of development in the area. It is expected the City of Cumberland will provide the resources needed for connecting the municipal water supply to these residences.

Once you have reviewed these comments and recommendations, we would welcome the opportunity to answer any questions. We also believe it would be most fruitful to more fully discuss the technical aspects of the RI/FS report and these comments in detail toward the end of achieving agreement on a proper and cost effective remediation.

Very truly yours,

Richard R. Molleur

Richard R. Molleur

Attachment

ATTACHMENT "A"

CONCLUSIONS

Regional groundwater flow, as traditionally based upon hydraulic gradient, is in the northwest direction for this area. Flow direction is further complicated by the geology of the area (i.e., fractured shale and structural elements). Further analysis of historical and possibly additional field data is needed to understand these flow patterns, especially in local areas.

Local flow patterns may render a clearer picture of actual flow. This is evidenced by the CC&SC site where it is seen that steep gradients demonstrate flow toward and discharging to an unnamed tributary. At this site localized flow is towards the southwest as opposed to regional flow to the nortnwest.

It is also unclear whether water percolated through the waste mass on the CC&SC property will if at all reach the water table. At this point in time, the well data directly downgradient and beneath this location indicates that it will not.

INTRODUCTION

Comments are included herein on the hydrogeologic investigation of the Remedial Investigation (RI) Report for the Limestone Road Superfund Site, Cumberland, Maryland. The probable regional groundwater flow patterns and localized groundwater flow patterns near the Cumberland Cement & Supply Co. (CC&SC) are discussed.

REGIONAL GROUNDWATER FLOW

The RI Report has obtained a voluminous amount of field and historical data to support their interpretation of the regional groundwater flow. However, these flow patterns are not clear-cut in a fractured shale media.

Regional flow is typically based on the hydraulic gradient which would be to the northwest at this site. At this particular site the flow direction is complicated by the existing subsurface (structural) geology and fracture patterns of the shale. The latter items have probably more influence on groundwater flow and need to be analyzed further. Another key (and controversial) issue at this site is the anisotropic nature of the aquifer.

Structurally, the strike trends to the southwest-northeast and the dip averages about 70° from the horizontal. This indicates that the groundwater flow is perpendicular to the general strike, which is unreasonable. Primary fracture patterns as exhibited in Figure 4-4 of the RI Report also parallel strike, but possible secondary fractures are perpendicular to strike.

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The structural elements just discussed require further analysis to define vertical and horizontal flow patterns in groundwater. The State of Maryland made some pertinent comments regarding this. Data is needed to understand the regional as well as localized flow patterns, possible recharge points, and artesian conditions. Presumably, Maryland has ready access to such geologic information (historical data) and would be useful to obtain.

Finally, a comment on treating fractured shale as porous media. The consultant in the report is clearly aware of the anisotropic and heterogeneous nature of the flow. The method used was discussed in Appendix C (Snow's method employs anisotropy for flow). Also, Freeze and Cherry claim it is a common approach in field investigations to mathematically treat contaminant migration in fractured media as porous media of an isotropic and homogeneous nature.

PROBABLE LOCAL GROUNDWATER FLOW PATTERNS AT THE CC&SC SITE

The regional flow, as stated earlier due to change in water level, is to the northwest. However, at the CC&SC site, local groundwater flows from upland areas and discharges to the intermediate stream just southwest of the site as indicated by the groundwater contours (see Schematic Figure A). It is assumed that the major fracture patterns as depicted in Figure 4-4 of the RI Report do not influence the flow in this local area.

Infiltration occurs via precipitation into the overlying, more permeable fill at the dump site. The fill is overlying

fractured shale of lower permeability. The flow proceeds vertically to the groundwater and is discharged to the stream (see Schematic Figure B). Evidence of artesian conditions at Well MW-12 (see RI Report p. 4-5) indicates discharge which is probably due to topographic control.

This dump area is a ravine surrounded by steep gradients. Natural runoff can occur from the north (City Dump) and to the southwest as well as from the CC&SC site directly affecting the stream. Interflow in the thin permeable soil layer is a small contribution in addition to runoff since erosion occurs on the steep slopes.

The fractures of Figure 4-4 of the RI Report indicate secondary (possible) fractures near the stream and a principal fracture set just northeast of the CC&SC site. Remote sensing data for this local site would aid in locating local lineaments and surface fracture traces. It is assumed that aerial photographs were used to locate the fractures in Figure 4-4.

In regard to structure, strike of the beds is north-northeast to south-southwest. Localized flow indicates compliance with strike. It is assumed that the angle of dip is approximately 70°.

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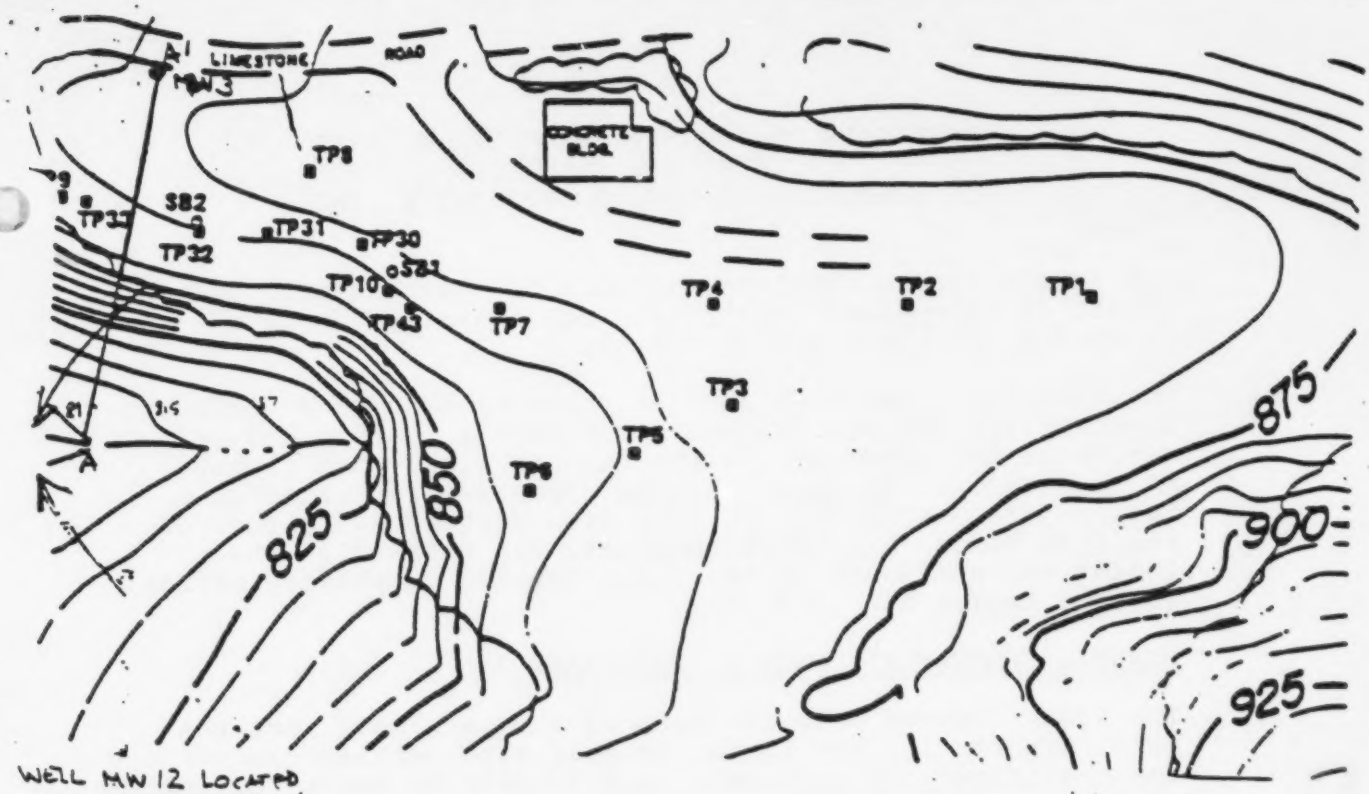
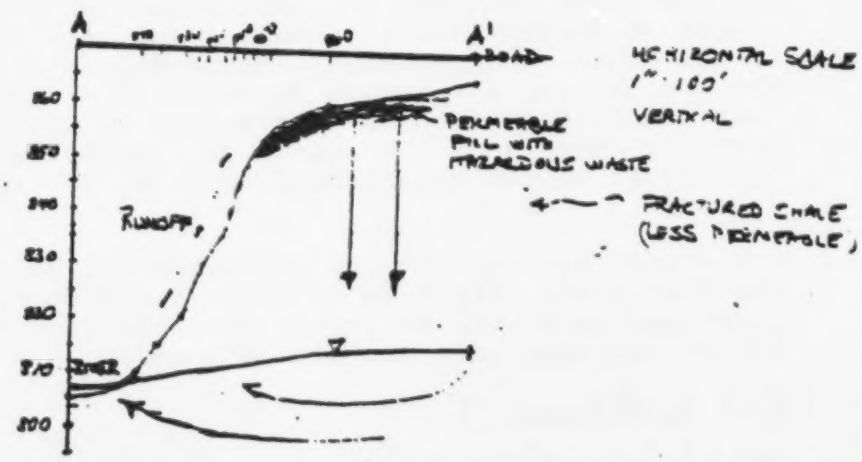


WELL MW 12 LOCATED NEAR CONTOUR 800' DOWNSTREAM (WATER LEVEL = 800.48')

TP6 = TEST PIT 6

NOTE: Test pits 1, 2, 31, 32, and 43 were not sampled.



SCHEMATIC FIGURE 5. PROFILE & CROSS SECTION A-A'

RESPONSES TO COMMENTS FROM HERON, BURCHETTE,
RUCKERT AND ROTHWELL
(ON BEHALF OF FAIRCHILD INDUSTRIES, INC).

The agency agrees with the majority of the comments made on behalf of Fairchild Industries, Inc. in reference to the RI/FS for the Limestone Road site.

The following responses address comments made on a paragraph-by-paragraph basis. Fairchild's comments in this set of responses are sometimes paraphrased or simply not repeated to shorten the response. Actual comments are listed in a letter dated September 10, 1986 from Richard R. Molluer of the firm Heron, Burchette, Ruckert, and Rothwell. The letter was addressed to Ms. Susan Belski, Compliance Officer for the Region III, U.S. EPA.

GENERAL COMMENTARY, PAGE 1, PARAGRAPH 3

The agency agrees with the general comments made that the RI/FS reports for the Limestone Road site contain assumptions and qualifications that made it difficult to reach "definitive affirmative conclusions" as to site contamination and endangerment.

The statement that the soil contamination onsite has minimal impact on surface and groundwater and, therefore, presents little or no endangerment to human exposure does not address the possibility for future releases or changes in site physical conditions (such as excavation for future site development) or changes in the amount or type of leaching water, that could affect the circumstances of contamination or endangerment.

The agency agrees with the statement the contributions of the Cumberland City Dump to overall contamination raises questions as to the source of contamination and hence responsibilities that have not been addressed.

PAGE 2, PARAGRAPH 1

The results of the endangerment assessment have shown that if chromium-containing soil were to be ingested at a certain rate, a significant endangerment to public health could result. In this instance, an endangerment to public health is considered a form of environmental endangerment. The agency agrees that the valence form of the chromium that is present is unknown, and recognizes that chromium may be present in the less toxic, less mobile, trivalent form. However, this is speculation only and cannot be confirmed with raw data. Therefore, it is not certain that the chromium on the CC&SC property presents little or no endangerment.

The source of the allegation that 99 tons of chromium containing sludge were dumped is supported by a written report of an interview with a waste hauler that was conducted by the Maryland Department of Health and Mental Hygiene during a sampling trip on April 23 and 24, 1981.

PAGE 2, PARAGRAPH 2

Yes, the agency agrees that the unresolved issue of the Cumberland City Dump partially explains why the FS makes no specific selection of a remedial alternative. However, the essential reason that the FS makes no selection because the decision of the best remedial alternative could only be made by U.S. EPA Region III after the public comments were taken into account.

PAGE 3, PARAGRAPH 1

EPA has been conducting a potentially responsible party (PRP) search of the site in an effort to identify PRPs and gain a PRP cleanup at the site. EPA requests that if you have information which would assist EPA in conducting the PRP search, that you provide that information to EPA as soon as possible. Please also be advised that EPA is currently reviewing its file information in an effort to identify any additional PRPs.

1. Adequacy of Investigation

PAGE 3, PARAGRAPH 2

The RI recognizes the fact that background samples were taken from different soil strata than the subsurface site samples and has presented this as a limitation surrounding the interpretation of the results.

A chemical analysis of the onsite shale was not considered as part of the scope of work initially agreeed upon by the EPA, State of Maryland, and CH2M HILL, because the problems currently associated with the assessment of groundwater contamination were not anticipated.

PAGE 3, PARAGRAPH 3

As far as we can tell, the only issue Dr. Grosser takes with the RI report is the direction of groundwater flow being perpendicular to the strike of regional structure. We have repeatly qualified this statement throughout the RI report and acknowledge that flow paths other than the assumed principal flow direction can and probably do exist. Based on our review of Dr. Grosser's comments we are somewhat puzzled by Fairchild's attorneys' comment on page three of their letter regarding their "serious concern about the adequacy of the hydrogeologic investigation ." These concerns are not supported by Dr. Grosser's comments as presented in Attachment A.

2. Endangerment Issues

PAGE 4, PARAGRAPH 1

The agency agrees with the assessment of the major endangerment issues relating to onsite soil and groundwater contamination.

A. Soil

PAGE 4, PARAGRAPH 2

The agency agrees with the summary provided of the remedial objectives. Table 1 in the FS was a draft version that should be updated with Table 6-19 from August 8, 1986 version of the RI to include other members of the polycyclic aromatic hydrocarbon familiarity of chemicals. These chemicals were initially not addressed because of differences of opinion found in guidances on their quantitative assessment. Inclusion of PAH's in the FS does not alter the curent status of the remedial alternatives proposed.

The agency agrees with the supposition that the major organic contaminants are unlikely to migrate from the site through the soil, although it does not presuppose that the migration of chemicals could not occur at some future time.

PAGE 4, PARAGRAPH 3

The statement that "concerns regarding migration of the major inorganic contaminants at the site should be minimal: is not entirely agreeable to the agency. Although the inorganic contaminants are probably current being influenced by sorption, and as such have not migrated to the groundwater, their sorption depends upon a variety of changing variables such as the pH of the leaching water, the oxidation-reduction potential of the soil and leaching water, the microbial activity in the soil, and the organic content of the soil. Therefore, the agency contends that the migration of the inorganic contaminants, although not currently evident to a significant estent, may in the future become more than a minimal concern.

PAGE 4, PARAGRAPH 4

Chromium was not detected in the groundwater at concentrations considered threatening to human health. The agency has offered a possible, but not certain, explanation that the reduced for of chromium may be complexed with organics and hence less mobile.

PAGE 5, PARAGRAPH 1

Capping would further minimize infiltration into the contaminated areas, besides minimizing direct contact. Fencing will only provide site security.

B. Groundwater

PAGE 5, PARAGRAPH 2

As described previously in response to the comment on Page 4, Paragraph 3, the agency does not consider the migration of inorganics unikely although it does agree that minimizing the possibilities for excavation and erosion will lessen the likelihood of contaminant migration to groundwater and surface water.

PAGE 5, PARAGRAPH 3

The Agency does not disagree with points contained in this paragraph.

PAGE 5, PARAGRAPH 4

The presence of zinc in the residential well groundwater may have attributable to naturally occurring sources, conveyance pipes, storage tanks, or the landfill area. Data limitations have resulted in the inability to characterize the source of the zinc further.

PAGE 6, PARAGRAPH 1

The agency agrees with this paragraph, but calls attention to the instances where lead exceeded Interim Primary Drinking Water Standards.

PAGE 6, PARAGRAPH 2

The agency agrees with the statements in this paragraph.

PAGE 6, PARAGRAPH 3

Elevated levels of arsenic, barium, cadmium, copper, lead and silver were found in the fly ash and soil-like material sampled from the Cumberland City Dump. The RI suggests that the fly ash material could be easily transported via wind and water borne routes and, therefore cause elevated concentrations of the above elements in the soil and sediment. Groundwater in contact with this waste mass could be a source of the inorganics.

Page 6, PARAGRAPH 4

The agency agrees with the first statement of this paragraph and has addressed the question of chromium's mobility in the response to the comment on Page 4, Paragraph 4.

The agency is in concurrence with the option that the mimeralized groundwater in the area of the site makes in difficult to draw conclusions regarding groundwater degradation attributable to landfill areas.

Certain levels of cadmium, lead. manganese, iron, nickel, and zinc in the groundwater exceed applicable standard and or acceptable daily intake rates.

C. Surface Water and Sediment, Page 6, Paragraph 5

The agency agrees with the statements made in this paragraph.

PAGE 7, PARAGRAPH 1

The agency does not agree that potential erosion risks are dealt with adequately by fencing and deed restrictions alone. This is because of the steep nature of the CC&SC property above the drainage stream. Deed restrictions will allow the further growth of vegetation that will determine erosion, but will not solve the problem in a direct fashion.

PROPOSED REMEDIAL ACTION, PAGE 7, PARAGRAPH 2

The agency agrees that the remedial action at the site should include the articles mentioned, but feels it should not be strictly limited to these actions.

PAGE 7, PARAGRAPH 3

Again, the agency agrees that the remedial action at the site should include the articles mentioned in paragraph 2 of page 7 but maintains that other actions are also necessary. The agency agrees that contamination in the soil and the possible effect of the contaminants on ground water are major environmental concerns at the site.

PAGE 7, PARAGRAPH 4

The agency agrees with the statements made in this paragraph, although it has not determined a sufficient time period for monitoring.

PAGE 8, PARAGRAPH 1

EPA disagrees with this paragraph and has included capping as part of the selected interim remedy. The cap will minimize the leaching of contaminants from the soil into the ground water and will control the erosion and migration of site contaminants from site soils into surface waters.

PAGE 8, PARAGRAPH 2

EPA and the State are proposing additional hydrological studies to define movement of ground water in the area. Once these studies have been completed, EPA and the State will evaluate future remedial actions.

GLT611/13

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September 12, 1986

FEDERAL EXPRESS

Ms. Susan E. Belski (3HW16)
Compliance Officer
United States Environmental
Protection Agency
Region III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SEP [illegible] 1986

Re: Limestone Road Site
Cumberland, Maryland
3HW16

Cumberland Cement
and Supply Company

Dear Ms. Belski:

I write on behalf of Cumberland Cement and Supply Company ("Cumberland Cement") in response to a letter dated August 11, 1986 from Steven R. Wassersug. Mr. Wassersug's letter accompanied the draft RI/FS respecting the above-mentioned site and indicated that EPA was interested in comments regarding the RI/FS. Your office has requested such comments be forwarded no later than the date of this letter.

As a prefatory matter, Cumberland Cement adopts the discussion contained in the "General Commentary" section of the letter dated September 10, 1986 to you from Richard R. Molleur, Esquire, counsel for Fairchild Industries, Inc. Cumberland Cement, of course, reserves the right to supplement those comments as future discussions and analysis may warrant.

As a further comment, Cumberland Cement has strong reservations about the validity of the cost estimates for certain major components of the assembled alternatives in the FS. The estimates prepared by EPA's contractor are grossly understated. At Cumberland Cement's request, a respected, interstate engineering and construction firm with operations

in Western Maryland prepared estimates for projects listed in Tables 5-3 (soil alternatives evaluation matrix) and 5-4 (groundwater alternatives evaluation matrix) of the FS. The Western Maryland firm, which has extensive experience in undertaking such projects in the region where the site is located, determined that the actual costs of the proposed alternatives far exceed the estimates set forth in the FS.

For example, the Western Maryland firm estimated that the cost of a clay cap -- not including topsoil -- for the Cumberland Cement parcel of the site would be $655,000.00. However, the FS estimate lists the capital cost for that same portion of the site at only $181,500.00. (FS, Table 5-3). Further, EPA's contractor estimated that the capital cost of providing an alternate water supply, by means of extending the City of Cumberland water distribution system to the Limestone Road residents, to be only $176,800.00. (FS, Table 5-4). The Western Maryland firm, however, estimates that the same work will cost between $450,000.00 and $500,000.00. Finally, the construction of a surface water interception and diversion trench -- a remedial alternative that EPA has made clear it does not intend to pursue -- is estimated by the Western Maryland contractor to have a total cost of $700,000.00; the FS estimated the capital cost of that diversion system, a major undertaking, to be only $390,000.00.

For obvious reasons, the validity of the cost estimates prepared by EPA's contractor is clearly suspect. The astonishing discrepancy between the two sets of estimates compels the conclusion that further detailed and independent analysis of the assembled alternatives must occur before Cumberland Cement can fairly be expected to participate in any voluntary plan for remedial action.

I also write to advise you that Cumberland Cement concurs in the discussion entitled "Proposed Remedial Action" in Mr. Molleur's letter of September 10, 1986 to you. Cumberland Cement believes that, as generally outlined, the proposed action will be an adequate response to the environmental circumstances at the site. As discussed in my August 26, 1986 letter to you, all the interested parties, and the various governmental units, will need to address allocation of costs and responsibilities for the preparation of the RI/FS and the execution of any remedial action. Consistent with the purpose and thrust of CERCLA, remedial action must be cost effective and Cumberland Cement's

participation in any such plan is inexorably bound, of course, to its financial ability to so participate.

I look forward to discussing these comments with you in the near future, in the hope that an appropriate conclusion can be reached soon respecting remedial action at the Site.

Sincerely,

Philip M. Andrews

PMA:jac
cc: Mr. Charles S. Steiner
W. Stevens Hidey, Esquire

DRAFT RESPONSES TO COMMENTS FROM KRAMON AND GRAHAM
(WRITING ON BEHALF OF CUMBERLAND CEMENT
AND SUPPLY COMPANY)

Comments by Kramon and Graham pertain to selected cost estimates presented in the FS. The FS cost estimates are based on numerous assumptions regarding size, location, physical conditions (such as soil depth and applicable construction methods), health and safety requirements, climate, availability of construction materials, etc. Cost estimates prepared in the FS are for comparative purposes. It is probable that the cost estimates will change as details of alternatives are developed through the predesign and design process.

GLT611/12

State of Maryland

OFFICE OF ENVIRONMENTAL PROGRAMS
DEPARTMENT OF HEALTH AND MENTAL HYGIENE

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Adele Wilzack, R.N., M.S., Secretary — William M. Eichbaum, Assistant Secretary

July 28, 1986

Ms. Stephanie Del Re
Remedial Project Manager
U.S. Environmental Protection
Agency
Region III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

Dear Ms. Del Re:

This letter is in response to the draft Remedial Investigation/Feasibility Study (RI/FS) for the Limestone Road Site. On July 15, 1986 you arranged a technical meeting with your staff and the consultant to discuss the draft Remedial Investigation. Two of Waste Management Administration personnel attended this meeting to ask questions about the consultant's report. The Feasibility Study was not addressed at this meeting and you indicated another meeting would be arranged to discuss this document. This letter contains comments on our major concerns with the draft Remedial Investigation. Our Comments are listed in two categories; general comments concerning the overall report and specific comments relating to certain parts of the report.

I.) General Comments

1) The report is not direct enough in its wording. Too often vague terminology was used that detracted from the impact of the report. In later drafts the use of words such as "possibly", "probably", and "most likely" should be avoided. If there is doubt concerning a specific statement or if there is no supportive data, then this should be stated.

2) The report does not address all possibilities or alternatives when making its conclusions. During our meeting it was learned that many aspects had been considered, yet only one was presented in the report. All pertinent aspects addressed by the consultant should be included into the text of the report.

3) The report lacks significant support data which is needed to make its conclusions. Some of this data is merely historical (such as references that discuss the geology of the area and the nature of the bedrock), some would be illustrative to the reader (such as; a) temporal and spatial maps of investigated parameters, b) maps that indicate changes in, stream quality related to specific site areas, etc.), while some data missing are crucial to the study. There is a lack of good background sample data representative of the area. Finally, no definitive data are presented that confirm that contamination of the sites is attributable to the study area.

4) The Hydrogeologic Assessment of the Limestone Road Site is over simplified. Although the report acknowledges that the bedrock beneath the site is well fractured, the report treats the site as if it were a porous media aquifer. More specific comments concerning this are discussed later.

5) There are inaccuracies throughout the report which needed to be corrected. First, the terms mg/kg and ug/kg are used inconsistently. In addition, all figures should be clearly labeled as ppb or ppm. A number of values on the tables are incorrect and some cited values in the report do not match the tables.

6) It is unclear what background concentrations are being used in many of the Tables and Figures. For example, in Figure 4-15, CC & SC Property Monitoring Well Organics, what are the background concentrations for each of the parameters being investigated, and where were these values obtained from? This type of information would be extremely useful to the reader.

7) One aspect not considered in the report is that inorganic aqueous data from the monitoring well decrease with time from Phase I to Phase III. An evaluation of this must be made in the report.

8) As was discussed by your toxicologist there

are substantial concerns in Chapters 5 & 6 of the Remedial Investigation. A few of the points are as follows: The Contaminant Transport and Fate Chapter does not adequately address the environmental issues. In the Endangerment Assessment there is overestimate of the risk of ingestion. EPA has a major concern of using arsenic in the manner addressed in the report. It lacks detail on fugitive dust and dermal considerations. A complete public health evaluation needs to be addressed. Many of the statements are "boiler plate", and need to be site specific.

9) The changes required to improve this Remedial Investigation (RI) will have a direct impact on the Feasibility Study (FS). In at least two places the FS states the "report is based on the information and data presented in the Remedial Investigation Report." Since the RI has to be rewritten, and many of the changes made in the RI have to be incorporated into the FS, we will reserve our comments on the FS until the next draft of the RI is completed. We assume that is why the FS was not discussed at the July 15th meeting and why another meeting will be arranged to discuss the FS.

II. Text Comments

1) p-3 Remedial Investigation

The text states that 16 monitoring wells were installed on site, when in fact 21 monitoring wells were used for the study.

2) p-3 Hydrogeologic Investigation

The text recognizes that the shales are fractured, yet the discussion of this paragraph considers the simpler porous media groundwater flow. It is unreasonable to make this assumption, knowing that the shales are fractured.

3) p-4 through p-6 - Various inorganic and organic constituents were noted to be above background concentrations. However, no definitive background levels for these constituents were found at the site in the sediment, soil, surface water and groundwater analyses.

4) p-9 City Dump Effects

The conclusions that groundwater is in contact with the Cumberland City Dump (CCD) waste is not

substantiated later in the text. If this conclusion is in fact true, it should be documented in later sections of the report.

5) p-10 Private Water Well Contamination

Although some inorganics were detected, they are isolated in occurrence and have more than one possible point source, which is not addressed in the Executive Summary (i.e. natural background, plumbing, etc.).

6) p. 2-1 Location

Although the Cumberland City Dump (CCD) is excluded from the Remedial Investigation (RI), it does not interfere with making appropriate conclusions for this RI.

7) p. 2-4 Geology

The discussion on the geology of the area is not adequate. This section should be subdivided into separate sections: structural geology, stratigraphy, etc. In addition, the deformational history and the resultant attitude of the rocks at the site are too brief and sections pertaining to the geologic history and geologic setting should be added. The depositional environment of the sedimentary rock has nothing to do with the structural geology. (See attached references for further information regarding the study area.)

8) p. 2-6, 2-7 Groundwater

The crest of Irons Mountain is only a natural surface water divide. It cannot be assumed to be a groundwater divide because of the fractured nature of the shales and the structural geology in the area.

Groundwater flowing from the Uplands to the Potomac River is too general of a statement, and not at all descriptive of site conditions. Is the flow parallel to strike or normal to strike? Does the groundwater discharge to intermediate streams prior to reaching the Potomac River or reaching the Potomac River or does it discharge directly to the Potomac River?

The discussion on the recharge-discharge area is unclear. Where are the recharge-discharge areas and how were they determined? Why is infiltration restricted to exposed bedrock only?

The effect of clays filling in fractures and reducing groundwater infiltration/permeability through the fractures is minimal. The fact that the clays are surficial in occurrence, soil cover is thin and steep slopes in the area allow for significant runoff, reduce the effects of the fractures being infilled.

The use of the term solution channels is misleading. Solution channels are associated with limestones and since there are no referenced carbonate units present in these shales, this terminology should not be used.

It cannot be assumed that upgradient and cross-strike limestones and sandstones recharge the site area. These units are up to one-half of a mile to the east, are well fractured themselves, and dip steeply beneath the site. Therefore, recharge of these units may go elsewhere other than downgradient to the site. To assume that water flows normal to the strike (and thus normal to the dominant fracture trends parallel to bedding) is unrealistic. Furthermore, the Oriskany Sandstone, which separates the shales on-site from the upgradient limestones, is well fractured and extremely porous. Any recharge in the limestones that might flow normal to strike along possible horizontal pathways would be intercepted by the Oriskany Sandstone.

Finally, since bedding plane fractures are present, and since bedding dips steeply to the west, there may be significant deep recharge both upgradient and on-site.

The term phreatic is not useful in describing groundwater conditions at the site. Groundwater conditions can be better described as being an unconfined aquifier with localized flowing to non-flowing artesian conditions.

9) p. 2-10 <u>Land Use</u>

The term "household - type hazardous wastes" is mentioned in the section and some concern is raised about this waste. Is the concern valid and are the landfill wastes truly hazardous?

10) p. 2-10 <u>Events leading to the Superfund Classification</u>

This section mentions the Region III FIT

conducting a preliminary assessment, when in actuality it was a site inspection with a minor portion on the preliminary assessment.

11) p. 3-4 Hydrogeologic Investigations

The characterization of aquifer conditions and groundwater flow direction is incomplete. These points must be addressed fully, (i.e. What are all the potential subsurface pathways and groundwater flow direction?)

12) p. 4-2, 4-3 Geology

This section should be labeled " Geologic Aspects that affect Groundwater". The exact strike/dip of the rock is not given. Some representative measurements and their locations should be given.

Why is the bedrock highly fractured in the upper 10'-15' zone? Is that due to weathering, drilling, etc.?

Where were the horizontal fractures that were mentioned observed, and what are they related to? Are they a surface phenomena or do they extend to depth? Why are only a small percentage of these horizontal fractures related to mechanical breakage?

What are representative orientations of all the fracture sets? (A table with this information should be presented.) Did any of the fracture sets have distinctive markings, such as, weathering, cementation, mineral growth or were they all fresh?

Regional fracture trends should be researched and presented in the discussion of fractures. (See attached references.)

Fractured rocks cannot be treated entirely as a porous media as stated. With regards to the Limestone Road Site the rock is not uniformly fractured in either direction or intensity. The shales are dominately fractured parallel to bedding, and different lithologies probably develop these fractures better. Hence, there are heterogeneties in the rock at this site which might create an anisotropic flow, rather than the simpler porous media flow described.

13) Figures 4-2, 4-3, 4-4

These figures should be labeled as being normal to strike. In addition, the strike direction of the rock should be shown on these figures.

14) Figure 4-5

The flow of groundwater is construed to be normal to the groundwater contour lines. Groundwater flow such as this is both normal to the strike of the rock and the dominant fractures present. According to Freeze & Cherry (1979) groundwater flow in a fractured media that has a known heterogenity can be in a direction other than normal to the equipotential lines.

15) p.4-4, 4-5 Groundwater Hydrology

It is assumed the water is moving normal to strike. Yet, the best fractures present at the site are parallel to strike. This has to be explained.

An important assumption is that the fractured shales can be treated as a porous media. Although the spacing and intensity may be treated as being homogeneous (although it is not proven), the orientation of the fractures is dominantly in one direction. Therefore, groundwater flow in the shales can only be treated as a porous media parallel to the fracture orientation.

The fact that monitoring wells in the valleys are under artesian conditions suggests that some type of control is present on the groundwater. Assuming a porous media, the artesian conditions would not exist.

The computed values for horizontal and vertical groundwater gradients should be referenced.

It should be stated more clearly that borings A-1, B-1, C-1, D-1 are also monitoring wells MWA-1, MWB-1, MWC-1, MWD-1.

The variability of both the vertical and horizontal hydraulic conductivities argues strongly against a porous media condition. This must be explained.

16) p. 4-7 thru 4-11 Hydrogeochemistry

Throughout this section no chemical analysis of the on-site shales was done. The lack of knowledge of what the shales contain and the fact

that no up-gradient wells are present hinder the ability to assess the background contribution of inorganic constituents. These facts should be brought out more clearly.

The assumption that different shales will contribute varying amounts of inorganics is misleading. Since these are all dark shales, deposited in similar environments, with similar source areas and a similar geologic history, the variance in inorganic constituents should be minor.

Due to the lack of a definite point source of contamination, the report assumes that inorganics in DW-7, DW-10, DW-14 are due to rock influences. However, there are other wells in the same area without an inorganic problem. In addition, DW-7 and DW-10 are the deepest wells (450' and 697', respectively). Therefore, these two wells may be intercepting a deeper flow.

Even though the residence time and the travel distance of the groundwater is important in terms of inorganics in the groundwater, these aspects are not that critical. First the distance separating all the residence wells is not that great and secondly, the residence time of the groundwater is not that substantial, considering your own groundwater velocities in Appendix C.

A natural occurence of zinc cannot fully explain the zinc in the residential wells. First, if the rock is the source, then there should be a fairly uniform concentration. Second, there are several nearby residential wells that don't have zinc. Third, all the wells with zinc are greater than 200' and the wells without zinc are less than 100'. All these points need to be addressed.

17) Table 4-3

Many of the average values do not agree with the actual values. In addition, many of the values are decreasing in concentration chronologically from Phase I thru Phase III. All these aspects should be explained.

18) p. 4-15, 4-16 Soil Contamination

TP-10 and TP-30 on the CC & SC property do not exhibit the highest values for arsenic, lead or barium as stated in the text. TP-18 on the Diggs property does not have the highest value

for arsenic or barium as stated in the text. Statements using values from the charts must be verifiable.

19) p. 4-17 thru 4-19 Organics

Several things in the text are implied but are not verified by the figures.

a) Many test pits on CC & SC property have organics and TP-10 and TP-30 are not the only isolated areas.

b) All the test pits on the Diggs property show similar concentrations of organics. This distribution of organics needs to be explained.

c) Why does the text use four soil borings, rather than use the thirty-four (34) test pit results to characterize the organics on-site?

20) p. 4-21 Inorganics

The text states the "source of lead in residential wells is unknown." Rather than draw on possible assumptions, this source should be investigated (i.e. solder, piping, etc.)

21) p. 4-26 Summary & Conclusions

Is the use of mg/kg correct or is the values ug/kg. These also need to be stated in ppm or ppb.

22) p. 5-1 Migration Pathway

Migration pathways of the groundwater is oversimplied. The use of porous media with groundwater flow perpendicular to the equipotential lines must be corrected. What flow paths do which residents lie along? Because of earlier comments, not much credence can be put into Figure 4-5. What is the contribution of inorganics to the surface water and stream sediment adjacent to,and below each of the sites? This should and can be mapped.

23) Figure 5-1 thru 5-7

These are an over simplification of site conditions. The more likely pathways should be

shown. Shouldn't these figures be referenced?

24) Table 5-1

This table would mean a lot more if it was done chronologically (i.e. separate Tables for Phase I, Phase II and and Phase III) and include the concentrations of the measured parameters. This would enable the reader to observe long-term and seasonal aspects.

25) p. 5-2, 5-3 Indicator Chemicals

It states that chemicals selected were found elevated above background. What were the background levels and locations, so comparison can be made? All of this needs to be discussed more thoroughly.

26) p. 5-4 thru 5-8 Indicator Chemicals Transport & Fate

Although the potential exists for volatiles, phenolics, base/neutrals, pesticides and PCB's to enter into the groundwater, it should be made clear that only inorganics have been found in the groundwater.

The FIT Report is referenced concerning organic contamination. This data should be included in the report.

Why would dissolved metal ions move slowly in groundwater that is reported to have high velocities. Conditions that inhibit metal ion migration should be explained. Have the effects of sorption and precipation been observed?

27) p. 5-9 Limitations of the RI

The lack of a good set of background samples to compare the sample analysis with severely limits the RI. With such a large site with possible multiple contributors this aspect should have been a priority.

28) Table 6-1

This table would mean more if it was done chronologically and if the concentrations were included.

29) p. 6-28 Summary

How often, where, and in what concentrations was chloroform found?

30) Technical Memorandum #6, Vol. 2

Either in this memorandum, or in the main body of the report, a complete discussion of the sampling techniques and rationale used should be given. It is unclear as to how and when water levels were measured. Were all the wells measured prior to sampling, or were the water levels measured at each well cluster during sampling?

31) The limitations of using filtered sample should be discussed in the report. In addition, to qualify the filtered sample results, the turbidity values of each of these samples should be given. If no measure of turbidiy is available, then a rough estimate of clear, cloudy, etc., should be given.

32) To make the review of the monitoring well data easier, all the data should be included into one table. For example, information needed are; well number, well depth, casing elevation, bottom elevation, grout seal depth, screened interval, water level measurements for Phase I, Phase II, Phase III, and well yields. Also, a discussion of which wells had good recharge versus those with a limited recharge capability should be given.

The above comments have been offered to improve the draft RI for the Limestone Road Site. These comments are meant to be constructive and in no way are they intended to be critical of the report or its data. If you have any questions, please contact me at (301)-225-5700.

Sincerely,

John W. Koontz, Administrator
Enforcement Program

JWK:jm

cc: Mr. Ronald Nelson
Mr. Frank Henderson
Mr. Robert Creter
Mr. David Healy
Mr. Ted Meyer

State of Maryland

OFFICE OF ENVIRONMENTAL PROGRAMS
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
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Adele Wilzack, R.N., M.S., Secretary
John M. Strobaugh, Assistant Secretary

September 10, 1986

Ms. Stephanie Del Re
Remedial Project Manager
U.S Environmental Protection Agency
Region III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

Dear Ms. Del Re:

We have received and reviewed the second draft of the Remedial Investigation on the Limestone Road site. Generally, the second draft reiterates the findings of the first draft and continues to apply a gloss of assumptions to groundwater flow, local geology and the extent of contamination.

The following are the State's comments, first general and then the specific comments:

I. General Comments:

1. This comment has been addressed. The second draft of the report has been made more direct.

2. The report has presented and considered alternate hypotheses for the data. However, the report is not thorough in its assessment of all the different alternatives.

3. This comment has not been addressed.

4. The hydrogeologic assessment has been drastically improved in the second draft of the RI. However, there are still some concerns with this section (see the following specific comments).

5. This comment has been addressed and it appears that most of the inaccuracies of the report have been corrected in the second draft.

6. This comment has not been addressed (see the specific comments, no. 3).

7. This comment has not been addressed (see the specific comments, no. 17).

8. Some of the concerns of this comment have been addressed.

9. This comment has not been addressed.

II. Specific Text Comments:

1. This comment has been addressed and corrected.

2. This comment has been addressed and the second draft of the RI now reflects WMA's concern that groundwater may be moving parallel to fractures in the bedrock.

3. This comment has not been addressed. Various organic and inorganic constituents are present in samples of sediment, surface water, soil, and groundwater that were presumed to be background. Secondly, a location considered in the text as background has parameters labeled as > or 5x > background. How can this be?

4. This comment has been addressed and now the RI states more clearly how it concluded that groundwater was in contact with the contents of the Cumberland City Dump.

5. This comment has been addressed.

6. This comment has not been addressed. WMA still maintains that appropriate conclusions can be made without the inclusion of the Cumberland City Dump into the RI. There is ample evidence present in the RI to make some definite conclusions and responsible recommendations.

7. This comment has not been addressed. There is a large body of background geological information pertaining to this area that has not been consulted. At a site where the geology is as complex as Limestone Road (by the RI's own admission), a thorough understanding of the site is needed to evaluate the flow of groundwater and the movement of contaminants from the site.

8. This group of comments has been addressed; however, the entire section on Groundwater is poorly rewritten. There are whole sections that have been duplicated, some sentences are poorly written, and the thoughts between paragraphs are poorly connected.

a. This comment was addressed but the revision is still inadequate. What type of divide is Irons Mountain and what is its importance in separating the Cumberland and Warrior Mountain Water Provinces? Isn't this merely a surface water divide?

b-f. These comments have been addressed.

g. This comment has not been addressed. Although the report is technically correct in using the terms "phreatic" and "vadose", these terms are not at all descriptive of the site aquifer conditions.

9. This comment has not been addressed. The RI still raises the issue that the Cumberland City Dump contains "house-hold hazardous waste", but no where in the report is this verified.

10. This comment has not been addressed.

11. This comment has not been addressed. The goals of the RI from the beginning were to "...characterize the aquifer conditions and determine groundwater flow directions...", yet the RI states that the aquifer conditions across the site are variable and there is no consensus of how or where groundwater flows from underneath the site.

12. This entire group of comments has not been addressed.

a. It is imperative that basic data such as the strike and dip of the major geologic structures (bedding, fractures, and anticlines) be included in the text of the RI so that future workers or readers unfamiliar with the area can evaluate the data.

b-e. These group of comments relate specifically to the RI's "alleged" fractures. The RI lacks any morphological, geometrical, or dynamic description about the various observed fractures in the area. This type of information is basic to the analysis and understanding of fractures.

f. This comment has been addressed adequately. In fact, the RI now contains a discussion on the fractured nature of the bedrock and

groundwater flow. However, as stated before in a letter, the potentiometric lines (or maps) only indicate potential direction of groundwater flow (see also comment 15).

g. Where are all the boring and monitoring well logs? The RI only has logs for monitoring wells 3, 5, 9, A1, B1, C1, D1, EB1, EB2, EB3.

13. This comment has not been addressed. By labeling these figures as being normal to strike, a person unfamiliar to the area will be able to understand the site geology better.

14. This comment has been addressed. The groundwater contour map (potentiometric map) has been redrawn and now portrays the possible site conditions more realistically.

15. This comment has been addressed. Now, the RI presents and considers the possibility that groundwater flow may be controlled by the fractured bedrock. However, there are still some concerns with some of the RI's statements and conclusions.

a. pp 4-4 through 4-6. The discussion on the groundwater gradient, both in the text and in Appendix C, is a simplistic view of groundwater flow that is contradicted by data in Table C-1. The text states that wells located in "upland areas" generally have slight downward gradients. However, the data in Table C-1 shows that MW 5/6 and MW 9/10 have strong downward gradients, MW 1/2 have a slight upward gradient and only MW 3/4 have a slight downward gradient. In addition, the text states that wells located in valleys generally have a strong upward gradient. However, the data in Table C-1 shows that of the four well clusters in valleys, one has a slight upward gradient (MW 11/12), one has a moderate upward gradient (MW 7/8), one has a strong upward gradient (MW B1/B3), and one has a strong downward gradient (MD D1/D2).

b. p 4-5. A potentiometric map does not indicate "... the principal direction of groundwater flow...", it only indicates the potential for groundwater flow. However, when other complicating factors such as fractures, variable vertical and horizontal gradients (an uneven aquifer surface) and the presence of different lithologies, potentiometric maps are not useful in determining groundwater flow directions. This same concept must be changed in Appendix C, pp. C-3, C-4 and C-5.

c. p. 4-8. The text states that it is "...probable that sufficient vertical fractures exist (perpendicular to strike) to allow flow along the same direction as the gradient." However, from the boring logs supplied in the Appendix (Appendix TM 7-1) the fractures parallel to bedding are the

only ones described. Where are these other fractures and what are they related to?

d. p. C-3. There is no evidence that the principal component of groundwater flow is cross-strike (i.e., normal to the bedding and the bedding plane fractures), nor is this fact obvious from any figure in the RI. Again, the potentiometric map can only be used to indicate the potential direction of groundwater flow. The argument used to substantiate cross-strike flow vs. parallel-strike flow is useful, but exactly wrong in logic. Consider this: MWA1, MW3, and MW11 are all parallel to strike and to each other, and they are all screened at approximately the same topographic elevation. Thus, they are quite likely to be in the same, or similar stratagraphic unit and under the same conditions. MWA1 and MW3 are both on a high plateau, and they both have similar groundwater head elevation. MW11 is downgradient and in a valley. It also has a lower groundwater head elevation than MWA1 and MW3. Thus, there is evidence of a gradient parallel to strike, and more importantly, there is no evidence of similar head levels at similar topographic elevations parallel to strike. The same cannot be said for cross-strike flow.

A similar relationship is seen between MWC3, MW9 and MW8. These wells are all screened at similar depths, and are parallel to each other and to strike. The upgradient well (MW9) has the highest head elevation, while the two downgradient wells in either direction parallel to strike, have lower elevations that agree with one another.

e. p. C-13. Fractured media can only be assumed to behave as a porous media in a direction that is parallel to the fractures.

f. pp. C-13 and C-14. There is a large discussion about fracture porosity and how it does not add considerably to the groundwater flow. However, the amount of porosity that the fractures contribute is not of concern, it is the degree of interconnectivity of the fractures that makes them significant to groundwater flow. The shales already have a good porosity. The importance of a well-developed set of fractures is that they increase the permeability of the rock.

g. p. C-16. Groundwater flow through a series of interconnected joints has not been proven by this RI. It has been assumed, and there is no indication as to which fractures are important, or how groundwater moves in those fractures.

From all of the above, it is apparent that the groundwater flow is very complex, and that the nature of the fracture flow and the distribution of the lithologies beneath the site are at the core of the problem.

16. This entire group of comments has not been addressed. Statements about what the rock can and cannot contribute to the groundwater are hindered by this missing data. According to WMA references, the chemical composition of all 9000 feet of the Devonian Shales does not vary much. For the RI to make this point, additional supportive data needs to be used. All the comments from our first letter still need to be addressed.

17. This comment has not been addressed. The temporal aspect with regards to the sampling data, especially from the monitoring wells, has not been considered. First, many of the inorganics in the monitoring wells (Tables 4-14, 15 and 16) seem to decrease in concentration over time. Second, many of the organics appear to follow this trend too. A reason for the former may be that the well drilling activity disturbed the rock and it has taken some time for all the rock particles to flush out. A reason for the later may be that the material used to construct the wells (PVC) caused some minor contamination. Bis (2-ethylhexyl) phthlates is a common byproduct of PVC. Since most of the wells only have this compound, and it only occurs at low levels, its presence may be due to the well material. (MWC1 and MW9 (consistently) have elevated values for B(2-E)P which must be considered to be from a different source.)

Finally, why wasn't sampling consistent from one phase to another? For example, Figure 4-20, the locations for surface water sampling varied during all the phases. Also, in Figure 4-18, why weren't all the monitoring wells sampled in Phase III?

18. This comment has been considered and corrected.

19. This comment has not been addressed. The data shows that the organic contamination at both the Diggs and the CC & SC properties are widespread. The comments that WMA made in its first letter are still valid and need to be considered.

20. This comment has been addressed.

21. This comment has been addressed.

22. This comment has been addressed and corrected.

23. Overall, the migration pathways are more thorough. However, the discussion is not site specific, but general in nature.

24. This comment has not been addressed.

25. This comment has not been addressed. Again, the text refers to the background levels of organic and inorganic constituents, but these levels are not clearly illustrated in a table or figure. A similar comment has been made under comment 3.

26. These comments have not been addressed. Only inorganics have been detected in groundwater monitoring wells. No. 1,1,2-TCA, TCE, or PCE were found in the monitoring wells. Also, why are the sample analysis from the FIT Site Investigation mentioned here when that data is not provided in the RI?

27. This comment has not been addressed. In fact, this entire section, which was useful, has been deleted from the text of the report.

28. This comment has not been addressed.

29. This comment has not been addressed. Why does the summary discuss the risk related to chloroform in the groundwater? Chloroform was only found in a few monitoring wells in Phase I, and at concentrations of less than 5 ppb. Furthermore, the discussion on page 4-29 on the RI relates the occurrence of chloroform in the groundwater samples to possible laboratory contamination.

30. This comment has not been addressed.

31. This comment has not been addressed.

32. This comment has not been addressed.

In summary, the Remedial Investigation is not a complete investigation of conditions at the site. We believe that the RI, within its limitations, provides a sound basis for a limited response at this time and further definition of the extent of contamination. However, the Remedial Investigation should not be presented as a conclusive review of the site.

If you have any questions, please contact me at (301)-225-5700.

Sincerely,

Arthur N. Caple
Acting Administrator
Enforcement Program

ANC:amj

cc: Mr. Ronald Nelson
Mr. Frank Henderson
Mr. Robert Creter
Mr. David Healy
Mr. Theodore Meyer

CH2M HILL RESPONSE TO STATE OF MARYLAND COMMENTS TO THE LIMESTONE ROAD REMEDIAL INVESTIGATION REPORT

GENERAL COMMENTS

1. No response necessary.

2. It is our opinion that our assessment was as thorough as necessary for the purposes of this RI report. Remedial investigations are conducted to gather sufficient data to support a feasibility study. It is our opinion that we have accomplished this goal. Remedial investigations are not designed to be exhaustive research projects examining every detailed aspect of an NPL site.

3. It is our opinion that the discussion of the regional geology is sufficient for the intended purpose of the RI report.

   A thorough discussion of the spatial and temporal distribution of observed contaminants is presented in the main body of the RI report.

   Figures were prepared but not included. They are available upon request.

   The number of background samples collected for any given site is often perceived to be insufficient. There is constant debate on how many samples are needed to establish "background" conditions.

   The remedial investigation has determined that environmental degradation has occurred in the site area from uncontrolled dumping and that this has the potential for posing a threat to the public health and the environment. The results of the study are inconclusive as to the source of this environmental degradation. Three possibilities exist: the former Diggs property, the CC&SC property and the Old City Dump.

4. No response necessary.

5. No response necessary.

6. See No. 3 under Specific Text Comments below.

7. An analysis of trends in aqueous inorganic constituents was conducted. Our conclusion is that there is no observable decrease or increase in these constituents over time. This is stated on page 4-20 of the RI report.

8. Specific portions of Chapters 5 and 6 were changed to reflect comments to the draft RI report. These changes have made the report acceptable to U.S. EPA.

9. None of the changes made to the RI report have affected the basic conclusions of the remedial investigation. Consequently, these changes have not had an impact on the recommendations presented in the Feasibility Study report.

SPECIFIC TEXT COMMENTS

1. No response necessary.

2. No response necessary.

3. Background levels for constituents in the soil, groundwater, surface water, and sediment have been presented in Tables 4-6, 4-9, 4-11, and 4-12 of the RI. A separate figure, Figure 4-10, was used to convey the constituents present in the background soils. It was not considered appropriate to repeat this background material on the figures for the various media. Figures 4-15, 4-16, 4-20, and 4-22 contain typographical errors involving the placement of asterisks under locations used as background. These asterisks should not be present.

4. No response necessary.

5. No response necessary.

6. We disagree.

7. The Cumberland City Dump is a large body of waste materials immediately adjacent to the site parcels. Relative contributions from the site parcels and the City Dump cannot be resolved at this time. It is our opinion that while a good understanding of the regional geology is important, an exhaustive discussion of this subject in the main body of the RI report is unwarranted.

8. It is our opinion that the section on regional groundwater is sufficiently detailed for the purposes of the RI report.

9. This statement (p. 2-11) referring to "household type hazardous waste" states that the amounts in the landfill are unknown.

10. This comment was not addressed previously, as comments from the State of Maryland were not sent in a timely manner and could not be addressed prior to submission of the August 8, 1986 RI document.

The documents in the EPA files that describe the events prior to classification of the site as a Superfund site are entitled "field" or "site" investigations. The terminology "preliminary assessment" was intended to include the investigations that took place pursuant the identification and assessment of the site as a hazardous waste site.

11. A detailed, precise understanding of all potential migration pathways in fractured bedrock is beyond the scope of a typical remedial investigation. It is our opinion that the system has been described adequately given the time and budgetary constraints imposed on the RI. The principal conclusion of the remedial investigation is that the groundwater flow system is sufficiently complex to warrant the exclusion of certain remedial actions in favor of others.

12. The strike and dip of the regional and local structure are discussed on page 4-2. A regional geologic map with references is presented in Figure 2-6. Local strike and dip measurements collected in the field were regrettably not included. These measurements generally agreed with regional trends. these measurements will be made available upon request through EPA.

    The occurrence of fracture sets is not alleged. Their occurrence is well documented in the boring logs contained in the technical memoranda in Appendix A of Volume 2 of the RI report. Horizontal fractures were observed in several of the cores. This is well documented on the rock core logs. It is speculated that some of these may be due to mechanical fracturing during coring (p. 4-3). It is our opinion that it is sufficient to note that the attitude and orientation of the fracture sets observed. Further discussion is academic and beyond the scope of the remedial investigation.

    As noted in Technical Memorandum No. 1 (RI Report, Volume 2, Appendix A), boring EB-01 was drilled and logged at monitoring well nest location MW11/MW12. Similarly, borings EB-02 and EB-03 were drilled and logged at locations MW1/MW2 and MW7/MW8, respectively. The logs for these borings are presented in Appendix TM-1-A. Their locations are shown in Figure TM-1-2. For all the others, the deepest boring at each location was logged.

13. After reading the RI section on the geology, examining Figures 2-6 and 4-5, it should be clear that the sections were drawn perpendicular to strike.

14. No response necessary.

15. a. Groundwater flow is governed by a potentiometric relationship. This is a fact. Groundwater flows from higher to lower potential. The data presented in Table C-1 do not contradict the discussion. One cannot make any statement about vertical gradients at well cluster D1/D2 because well D1 was determined to be dry. No water level was ever collected from this well. This is documented in Technical Memorandum No. 7.

b. It is our opinion that we sufficiently discuss the complicating factors which may arise to skew the direction of groundwater flow. We agree that a potentiometric surface map is an indication of the possible directions of flow and acknowledge that there may be components of flow in directions tangent to those indicated on the potentiometric surface maps.

c. Vertical fractures were noted in borings B-1 and C-1. Examination of aerial photographs indicates that there may be major vertical fractures perpendicular to strike trending along the ravine between the city dump and the Diggs property. Another fracture may exist along the ravine to the northwest of the City Dump. There are insufficient data to say anything further. It is beyond the scope of the RI to characterize every aspect of the site geology.

d. We acknowledge that other components of flow can and probably do exist in the area. This is discussed on p. C-4, Volume 2, Appendix C. This discussion is not intended to be an exhaustive dissertation on the subject.

e. We present this section for the sake of completeness. The numbers contained therein have no bearing on the conclusions of the RI nor do they affect the recommendations in the feasibility study. In this regard, the reviewer's comment, while technically correct, is academic and need not be considered further.

f. The purpose of this discussion is to introduce the concept of fracture porosity and make an estimate of its value. We state that secondary porosity is often greater than primary porosity. It is obvious that the interconnectedness of the fractures will have an effect on the hydraulic conductivity.

g. We repeatedly state that the flow is complex. Detailed characterization of the subsurface flow

system is beyond the scope of a remedial investigation. We acknowledge that better understanding of the system could be achieved. However, the time and budgetary constraints of the remedial investigation is such that we are assigned to make that best engineering decisions possible with the limited data generated by the RI. It is our opinion that the data generated by this RI were sufficient to conduct a feasibility study.

16. It is never definitively stated anywhere in the RI report that the seemingly anomolous concentrations of inorganic constituents are due to naturally occurring phenomena. It is made clear that the data are insufficient to make any definitive statement about the distribution of these constituents. The hypothesis is speculative and is offered as a possible explanation only.

17. This comment was addressed as response No. 7 of the General Comments section.

18. No response necessary.

19. a. See statement on Page 4-20 of the RI under "ORGANICS." The statement reads "Of the soil locations sampled from this site, many contained HSL organic compounds." Figures 4-12 and 4-11 show the numerous organics detected in the soil of both properties.

    b. All the organics detected in the test pits on the Diggs property do not show similar concentrations of organics.

    c. The text addresses the organics found in both the soil borings and test pits when characterizing the organics present (see Pages 4-20 through 4-22).

20. No response necessary.

21. No response necessary.

22. No response necessary.

23. It is our opinion that the discussion of migration pathways is sufficient for the purposes of the RI report.

24. Table 5-1 was the listing used to convey the reasons why a particular chemical was selected as an indicator chemical for the site. It was not intended to be a summary of the data.

25. Background locations and the concentrations of their constituents were discussed in detail in Chapter 4. It was not necessary to repeat this information in Chapter 5.

26. a. Chapter 5 is offered as a general description of the fate and transport of the indicator chemicals at the site. The figures and tables of Chapter 5 make it clear which indicator chemicals were found in the groundwater. In fact, the indicator organic chemicals bis(2-ethylhexyl)phthalate and chrysene were found in the groundwater.

b. The FIT report was referenced to provide an explanatory example of the possible rapid loss of a volatile chemical. Results of the FIT investigations were judged not to be of verifiably good quality and, as such, were not included in the RI (see Page 2-11).

c. The scope of work of the RI did not include measurement of the amount of sorbed or precipitated chemicals occurring in the groundwater. Current Contract Laboratory Program protocol does not distinguish the valence state of metals which is an indication of their likely environmental form.

Samples were filtered in the field to eliminate the interference of suspended materials that may have been generated during well installation. No measurement of particulate metals was available.

The conditions inhibiting metal ion migration have been addressed in Chapter 5.

With regard to the question, "Why would dissolved metal ions move slowly in groundwater that is reported to have high velocities?", the concept that "dissolved metal ions move slowly" has been taken out of the context of Chapter 5, where it is explained that metals will persist in the particulate fraction of groundwater and will, therefore, be relatively immobile as compared to the dissolved metal ions.

27. The "Limitations of the RI" section was moved to Page 6-37 of the RI. Subsequent to the first review draft of the RI, additional samples for sediment and surface water were reasoned to be inactive of background and considered to be as close to a "good set" of background data as was available.

28. Once again, the purpose of this table was to present the substances detected at the site. It was not intended

as a complete summary of the RI data. This was presented in Appendix B and in the Chapter 4 text and tables.

29. Chloroform's occurrence was described on Page 6-21. Chloroform was discussed because it was the only quantifiable carcinogen observed in the groundwater samples and as such did not lend itself to tabulation as for the other media. All chemicals that could be quantifiably assessed for risk, were. Chloroform was mentioned as a possible laboratory contaminant only. This was offered as a possible explanation for its singular occurrence.

30. Sampling techniques are described in detail in the Quality Assurance Project Plans and Sampling Plans prepared for this site. These documents are available from U.S. EPA. It is our opinion that the information contained in the Technical Memoranda sufficiently describe the procedures followed.

31. We do not believe that such a discussion is necessary. It is sufficient to note which samples were field filtered. Values of turbidity were not field or lab determined. Visual observations were made in the field but were not included in the technical memoranda.

32. Construction details of all monitoring wells are presented in either Figure TM-1-3 or Figure TM-7-3, v.2 Appendix A of the RI report. Water levels are summarized in Table C-1. This is a question of format. It is acknowledged that no mentioned was made of well recharge rates. This information is available upon request from U.S. EPA.

SUMMARY

The RI is as thorough as time and money allow. It is considered to be sufficient for the purpose for which it is intended, mainly to determine the need for and to support the feasibility study. It is not designed nor was it ever intended to be an exhaustive study into every aspect of the site.

GLT575/54